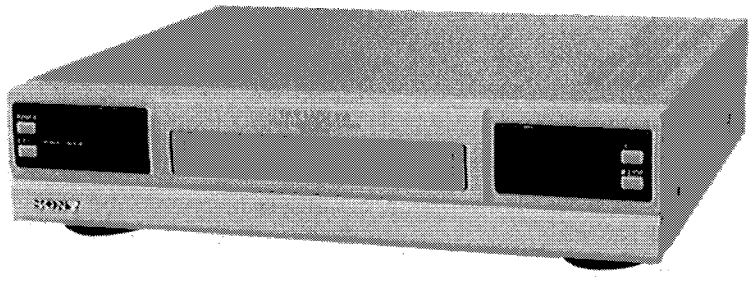
SVT-3000

SERVICE MANUAL

US Model
Canadian Model



SPECIFICATIONS

General

Recording method	Dual-head rotating helical scanning system
Audio recording	In 2-, 12-, and 24-hour modes
Tape speed	33.35 mm/sec (2-hour mode)
Specified video cassette tape	VHS 1/2 in. video cassette tape
Recording/playback time	2, 12, 24, 48, 96, 120, 168 hours (when using T-120 tape)
Fast-forward/rewind time	Approx. 5 minutes (when using T-120 tape)
Television system	NTSC color TV system

Video

Recording method	Luminance signal: FM method Color signal: Low-pass band-pass Transformation direct recording method
Input	1 Vp-p, BNC, 75 ohms unbalanced
Output	1 Vp-p, BNC, 75 ohms unbalanced
Horizontal resolution	Black & white mode: 300 lines or more Color mode: 240 lines or more

Audio

Input	315 mV (–7.8 dBs), phono jack 47 kilohms unbalanced
Output	315 mV (–7.8 dBs), phono jack 600 ohms unbalanced
Microphone input	–60 dBs, 3.5 mm minijack, high impedance

Connector

Alarm input	Low level
Alarm output	+5 V, 5.7 kilohms (Low active)
Tape end output	+5 V, 5.7 kilohms (Low active)
Switch output	+5 V, 5.7 kilohms (Low active)
Timer output	+12 V, 5.7 kilohms (High active)
Remote control input	3.5 mm minijack

Other specifications

Operating temperature range	5°C to 40°C (41°F to 104°F)
Operating humidity range	80% or less
Power supply	120 V AC, 60 Hz
Power consumption	18 W
External dimensions	Approx. 420 × 100 × 340 mm (w/h/d) (16 5/8 × 4 × 13 1/2 in.)
Mass	Approx. 5.7 kg (12 lb 9 oz)

Design and specifications are subject to change without notice.

MICROFILM

TIME LAPSE VIDEO CASSETTE RECORDER

SONY®

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the coustomer.
6. Check the B + voltage to see it is at the values specified.
7. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

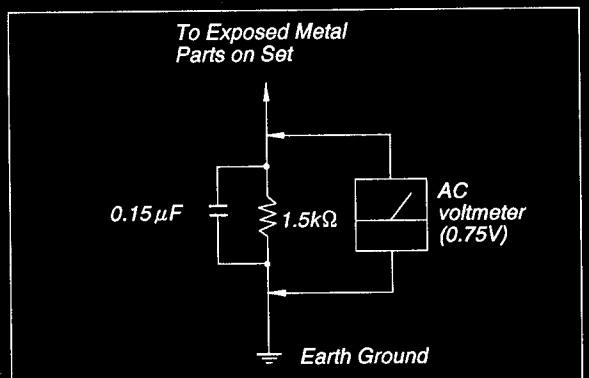


Fig. A. Using an AC voltmeter to check AC leakage.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturer's instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75V, so analog meters must have an accurate lowvoltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

SAFETY - RELATED COMPONENT WARNING!!

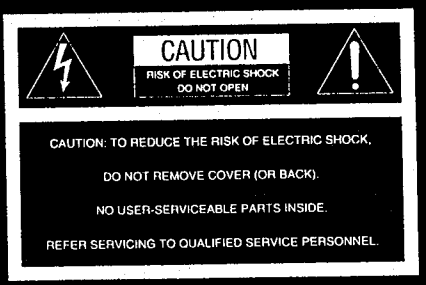
WARNING!! COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUB- LISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÈCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÉCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÉCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.


CAUTION
RISK OF ELECTRIC SHOCK DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

Note:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

For the customers in Canada

This apparatus complies with the Class A limits for radio noise emissions set out in Radio Interference Regulations.

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SVT-3000

SONY
SERVICE MANUAL

US Model
Canadian Model

SUPPLEMENT-1

File this Supplement with the Service Manual.

: Change portion

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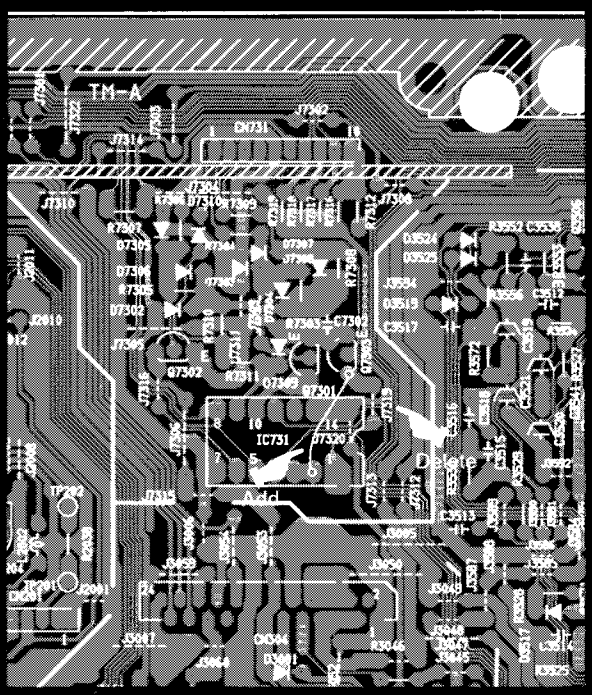
CP-1 BOARD



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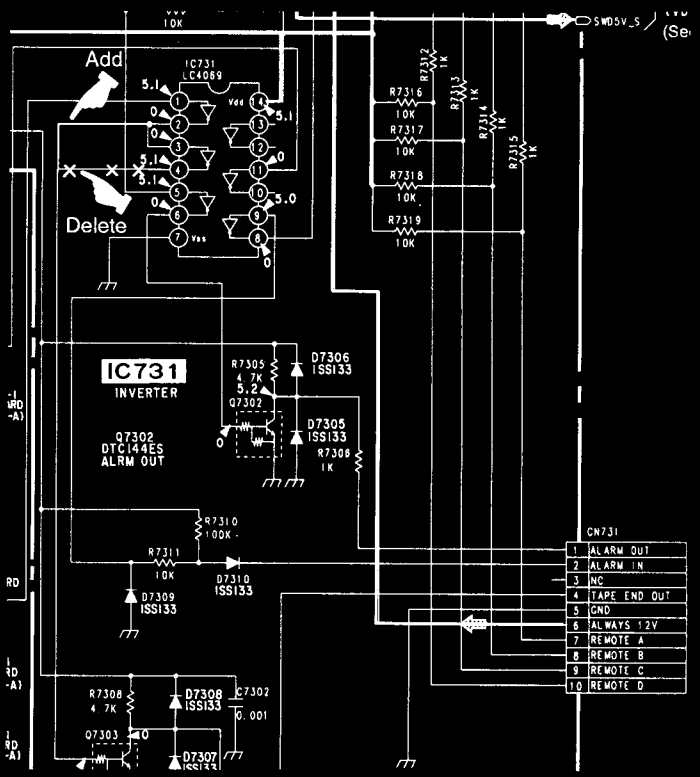

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<IC>

Add

IC711	1-810-857-11	IC	M38102M5-300SP (TIMER CPU)
IC712	1-808-855-11	IC	M6M80021P (CHANNEL MEMORY)
IC713	1-810-787-11	IC	MN1381 (RESET)

9-973-645-81

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Consumer A&V Products Company
Home A&V Products Div.

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Quality Engineering Dept.

Precautions

On safety
- Operate the unit on 120 V AC, 60 Hz.
- Should anything fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- If you are not using the unit for an extended period of time, unplug it from the wall outlet by pulling it out by the plug. Never pull the cord itself.

On installation
- Do not place the unit on surfaces (rugs, blankets, etc.) or near materials (curtains, draperies) that may block the ventilation slots.
- Do not install the unit near heat sources such as radiators or air ducts, or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
- The unit is designed for operation in a horizontal position. Do not install it in an inclined position.
- Allow adequate air circulation to prevent internal heat buildup.
- Keep the unit and cassette tape away from equipment with strong magnets, such as microwave ovens or large loudspeakers.
- Do not place any heavy object on the unit.

On operation
When the unit is not in use, turn the power off to conserve energy and to extend its life.

On moisture condensation
If the unit is brought directly from a cold to a warm location, moisture may condense on the video head drum. In this condition, the tape may adhere to the head drum and cause serious damage to the head. To avoid damage caused by moisture condensation, be sure not to leave a cassette inside the compartment when the unit will not be used.
If moisture condensation is present, the "dddd" indicator flashes in the display window and the unit will not operate. When the "dddd" indicator disappears, you can operate the unit.

On video cassettes
Remove and store video cassettes after recording or playback.

On cleaning
- Clean the cabinet, panel and controls with a dry, soft cloth, or a soft cloth slightly moistened with a mild detergent solution.
- Do not use any type of solvent, such as alcohol or benzine, which may damage the finish.

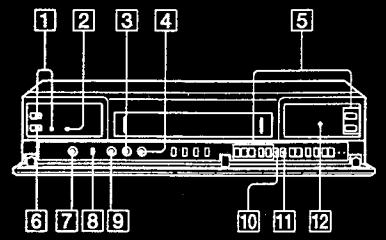
If you have any questions about the unit, contact your Sony dealer.

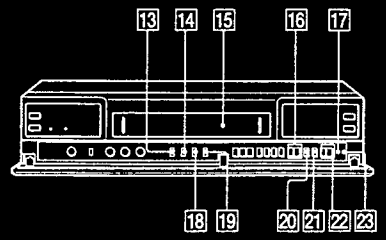
Labeling Parts and Controls

to be continued ►

Refer to pages in parentheses for details.

Front Panel

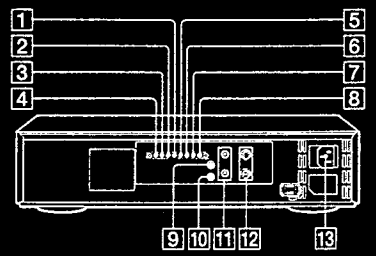




1 POWER switch and indicator
2 REPEAT indicator (10)
3 TRACKING NORMAL control (18)
4 TRACKING SLOW control (18)
5 Tape operation buttons
- ◄◄ REW button
- ► PLAY button
- ►► FF button
- II PAUSE/AL SCAN button
- ◄ REV button
- ● REC button
- ■ STOP button

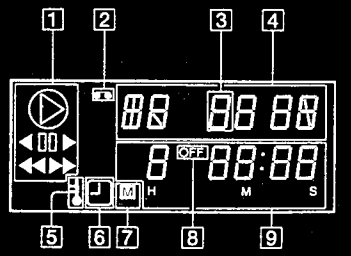
6 ▲ EJECT button (8)
7 SHARPNESS control (17)
8 PL RESET button (11)
9 STILL ADJUST control (19)
10 II► ADV/AUDIO ON button (17), (19)
11 PAGE button (6), (11), (12), (16)
12 Display window (24)
13 ALARM SPEED switch (14)
14 ALARM DURATION switch (14)
15 Cassette compartment (8)
16 SHIFT ▼/► buttons (6), (12)
17 AL RESET button (15), (16)
18 REPEAT REC switch (10)
19 TIMER REC (recording) switch (13)
20 COUNTER RESET button (18)
21 COUNTER MEMORY button (18)
22 REC/PLAY SPEED +/– buttons (6), (12)
23 T/D (time/date) RESET button (5)

Rear Panel



1 COM (common) terminal (21)
2 TAPE END terminal (22)
3 COM (common) terminal (21)
4 TIMER OUT terminal (21)
5 SW OUT terminal (21)
6 ALARM IN terminal (14)
7 ALARM COM (common) terminal (14)
8 ALARM OUT terminal (14)
9 MIC IN jack (4)
10 REMOTE jack (22)
11 AUDIO IN/OUT jacks (phono type)
12 VIDEO IN/OUT jacks (phono type) (4)
13 AC IN (inlet) (4)

Display Window



1 Tape operation indicators
2 Cassette indicator
3 Power interruption indicator
4 Tape speed/Alarm/Moisture condensation
5 Security lock indicator
6 ⏲ (timer recording standby) indicator
7 M (memory) indicator
8 OFF indicator
9 Linear time counter/Timer recording indicator

This section is extracted from instruction manual.

Overview of the VCR

Field recording/field playback
Because single fields can be recorded one by one in time lapse mode and all fields can be viewed separately during playback, you can record more information.

Audio recording in 12-/24-mode
You can record audio information with video information even in 12- or 24-hour mode and listen to it by selecting audio mode during playback.

Various recording functions
- **Autorepeat recording:** When the tape reaches the end, the VCR rewinds the tape and starts recording again from the beginning of the tape.
- **Timer recording:** You can set the timer on daily recording or weekly recording.
- **Alarm recording:** If an externally connected alarm sensor is triggered, you can make a complete recording of the situation that triggered the alarm.

Multiple recording modes
The time lapse intervals for recording can be set in 6 steps. At the longest interval setting, available recording time is a full 168 hours (7 days) with one 120-minute tape.

Used time indicator
This VCR has a built-in microprocessor equipped with a calendar function and shows used time of head drum and power on time on the monitor screen.

Alarm scan function
You can scan the alarm recording and play it back for five seconds.

Forward field advance
This VCR offers improved search functions with the ability to move forwards between fields.

Clock operation backup
When a power interruption occurs, the built-in rechargeable battery will provide backup power for the clock for up to 15 days.
Essential data, such as data setting, internal timer settings, recording time, and mode settings, are also retained.

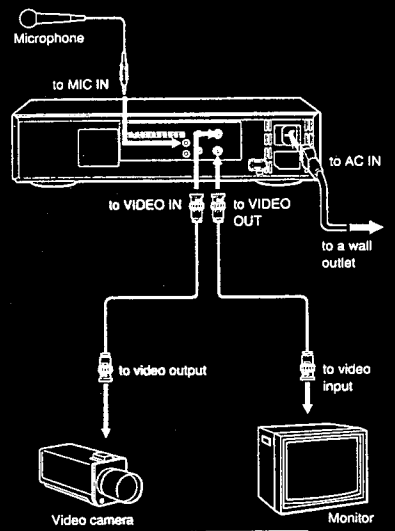
Security lock
To guard against operation errors, this VCR locks all of the buttons.

Connections

Turn all the power off before making connections.
Connect the AC power cord last.

Connecting a Camera, Monitor and Microphone

With the following connections, you can monitor the picture and sound.

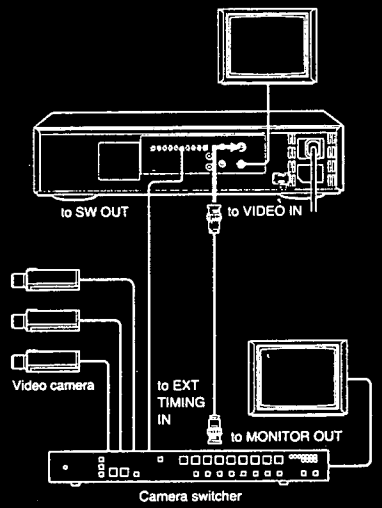


Use of BNC connector

Align pin with cutout, insert and turn right to lock.
To remove, turn left and pull out.

For alarm sensor connection, refer to page 14.

Connecting a Switcher



Note
When you connect several cameras to a switcher, synchronize the cameras.
If not, the picture will be disturbed.

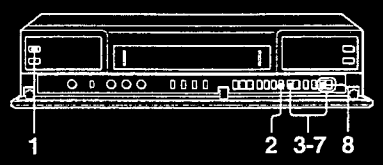
Resetting the Memory

When you use this VCR for the first time or place it in a new location, reset the memory.

Turn on the power and press T/D RESET.
When the memory is reset, the time/date setting are erased and the security lock function is released.
The VCR is automatically turned off.

Setting the Clock

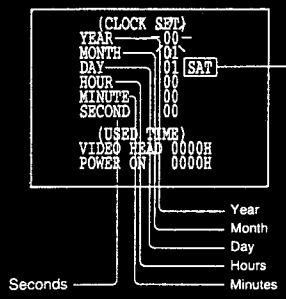
Set the clock to the current time and date on the monitor screen.



Example:
Set the date and time to 15:20 on October 15, 1995.

1 Turn on the power of the equipment to be used.

2 Press PAGE until the CLOCK SET display appears on the monitor screen.
The first display shows January 1, 2000.



3 Set the year by pressing REC/PLAY SPEED +/–, then press SHIFT ▼.

4 Set the month by pressing REC/PLAY SPEED +/–, then press SHIFT ▼.

5 Set the day by pressing REC/PLAY SPEED +/–, then press SHIFT ▼.

6 Set the hour by pressing REC/PLAY SPEED +/–, then press SHIFT ▼.

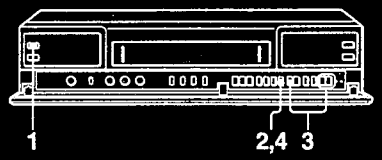
7 Set minutes by pressing REC/PLAY SPEED +/–, then press SHIFT ▼.

8 Press REC/PLAY SPEED – simultaneously with a time signal.
You can set the clock at the 00 second point.

After setting the date and time, press PAGE until the normal display appears.

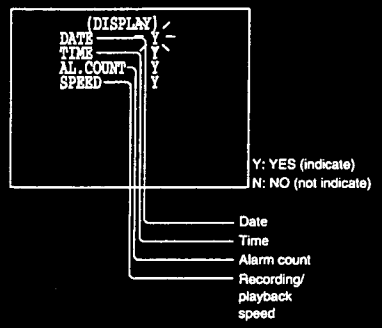
Setting the Time/Date Display

You can display four items of information, date, time, number of alarm recordings and recording/playback speed and turn off each item which you do not want to display.



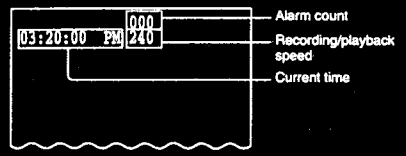
1 Turn on the power of the equipment to be used.

2 Press PAGE until the DISPLAY display appears on the monitor screen.



3 Press SHIFT ▼ so that the item to be set blinks and +/– to set to Y or N.
Example: When you set the date display to N.

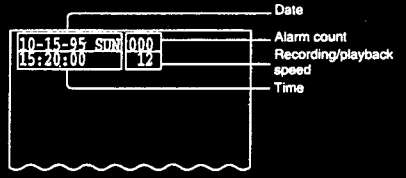
4 Press PAGE until the normal display (time/date screen) appears.



Changing the Display Position of the Time/Date Display

You can change the position of the time/date display that appears on the monitor screen.

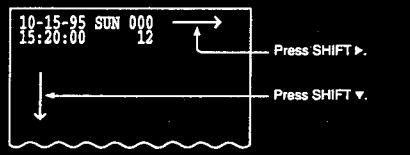
1 Press PAGE until the normal display appears.



2 Change the display position as follows.

To move the display downwards, press SHIFT ▼.
(When the display reaches the bottom of the screen, the display returns to the top of the screen.)

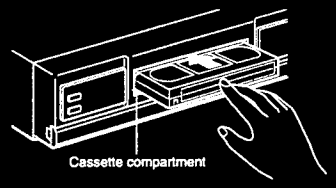
To move the display rightwards, press SHIFT ▶.
(When the display reaches the right-hand edge of the screen, the display returns to the left-hand edge of the screen.)



Handling a Video Cassette

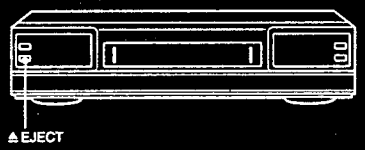
This section shows you how to insert a video cassette into the VCR.

Inserting a Video Cassette



Insert the cassette into the cassette compartment by slowly pressing its center with the arrow on the top.
When the cassette is inserted, the VCR automatically turns on and the ⏏ indicator lights in the display window.
If you insert the cassette without its safety tab for recording, the VCR ejects the cassette automatically.

Ejecting the video cassette



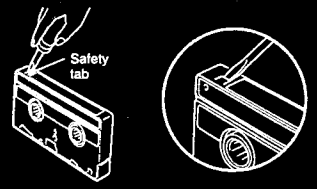
Press ⏏ EJECT on the VCR.
You can eject the cassette even when the power is off.
When you press ⏏ EJECT, the VCR turns on automatically.
After ejecting the cassette, the VCR turns off again.

Recommended cassette

This VCR is designed and calibrated with 120-minute tape (Sony T-120). To ensure stable operation and optimum picture quality, we recommend that you use a Sony 120-minute tape.

Protecting your cassette from being erased

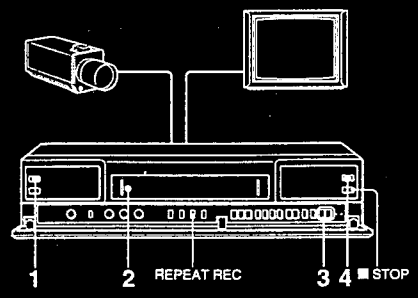
Remove the tab on the cassette with a screwdriver or a similar tool as shown below. This protects your cassette against an accidental recording.



If you want to record again on the cassette without its safety tab, simply cover the safety tab hole with a piece of plastic tape.

Recording

This section shows you how to record the signal from the video camera in the normal or time lapse mode, to set the security lock and to record repeatedly on the same cassette.



1 Turn on the power of the equipment to be used.

2 Insert the cassette.

3 Set the recording speed by pressing REC/PLAY SPEED +/–.

Recording speed	Maximum recording time with 120-minute tape (hour)		Interval (sec.)	Audio recording	Tape motion
2	Standard mode	2	1/60	Possible	Continuous
12	Time lapse mode	12	0.1		
24		24	0.2		
48		48	0.4	Impossible	Intermittent
96		96	0.8		
120		120	1.0		
168		168	1.4		

In the display window

4 Press ● REC.
Recording starts.

To stop recording

Press ■ STOP.

If recording does not start and the cassette is ejected

The tab on the cassette is removed to protect against accidental recording.

When the tape reaches the end

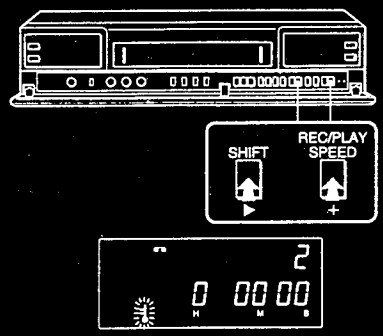
When REPEAT REC is set to OFF (see page 10), the tape is rewound to the beginning of the tape and stops. The OFF indicator lights in the display window.
Press ● REC, ►► FF, ◄◄ REW or ► PLAY to turn off the OFF indicator.

Locking the Record Mode — Security Lock Function

Locking the record mode is useful to guard against accidental recording interruptions when the VCR is used for surveillance or monitoring purposes.

To set the security lock

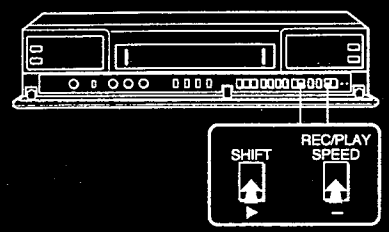
While pressing SHIFT ►, press REC/PLAY SPEED +.
The 🔒 indicator lights in the display window.



The security lock function also works in timer recording and playback modes.
The buttons and controls that you can use while security lock function is working
- SHARPNESS control
- TRACKING control
- STILL ADJUST control

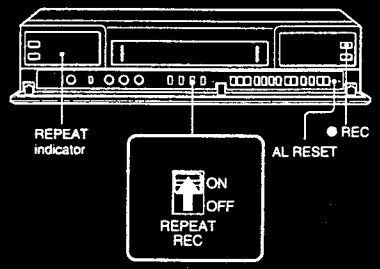
To release the security lock

While pressing SHIFT ►, press REC/PLAY SPEED –.
The 🔒 indicator turns off.



Recording on the Same Cassette Repeatedly — Auto Repeat Recording

Before operation
Check that the alarm count indicator shows "000". If not, press AL RESET with a ball point pen or similar object. (For details on Alarm Recording, see page 14.)



1 Set REPEAT REC to ON.

2 Press ● REC.
The REPEAT indicator lights and recording begins.
When the tape reaches the end, the tape is rewound at the beginning and recording resumes.

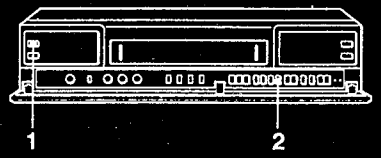
If the VCR receives an alarm signal during auto repeat recording
The recording mode switches to alarm recording (the REPEAT indicator disappears.) When the tape reaches the end, the tape is rewound and stops at the beginning.
The OFF indicator lights in the display window.

If REPEAT REC is set to OFF while auto repeat recording is in progress
Recording proceeds until the tape reaches the end and then stops automatically after the tape is rewound to the beginning. The OFF indicator lights in the display window.

Recording after Power Interruption or Moisture Condensation

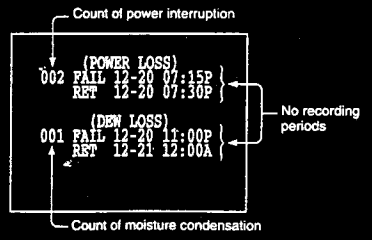
If a power interruption occurs, The P indicator lights in the display window and if a moisture condensation occurs, the "dddd" indicator blinks. Even if a power interruption or moisture condensation occurs while recording, the internal batteries provide backup power for memory for at least 15 days. After power is restored, press ● REC to start recording in preset mode. The internal batteries can be charged in about 48 hours.
If the power is interrupted during recording with the security locked, the recording starts automatically after power is restored.

To check power interruptions or moisture condensation

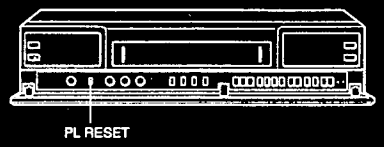


1 Turn on the power of the equipment to be used.

2 Press PAGE four times to display (POWER LOSS)/(DEW LOSS).
This shows a count of the power interruption and moisture condensation and the period when the recording was interrupted.

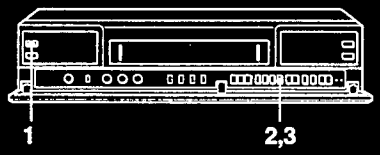


To clear the P indicator



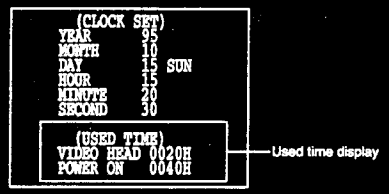
Press PL RESET.

Checking the Used Time



1 Turn on the power of the equipment to be used.

2 Press PAGE until the USED TIME display appears on the screen.
The VIDEO HEAD reading shows the amount of time the video head has been used, and the POWER ON reading shows the amount of time the power has been on.



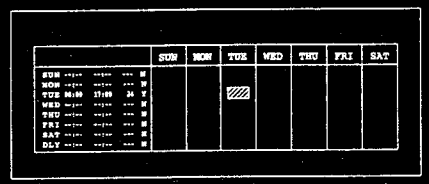
3 Press PAGE until the normal display appears.

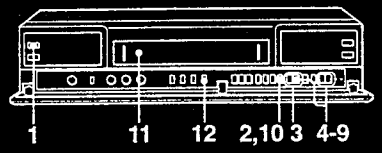
Timer Recording

You can set the timer recording in two methods: day of the week recording and daily recording.
Before starting, make sure that the time and date are set properly. (See page 6.)

Day of the Week Recording

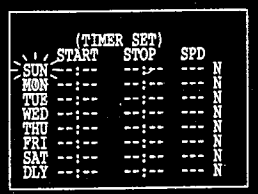
Example:
Making a recording from 8:00 on Tuesday to 17:00 the same day with the recording speed set to 24-hour mode.



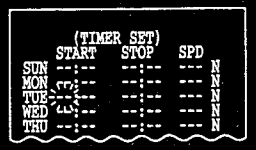


1 Turn on the power of the equipment to be used.

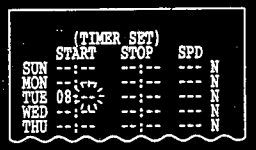
2 Press PAGE until the TIMER SET display appears on the screen.



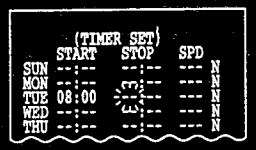
3 Press SHIFT ▼ to move the flashing to TUE and the SHIFT ▶ to move it to the hour position of START.



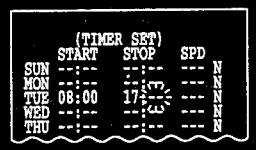
4 Set the start hour by pressing REC/PLAY SPEED +/– and press SHIFT ▶.



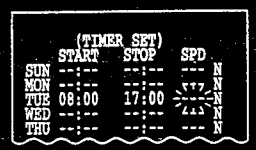
5 Set the start minute by pressing REC/PLAY SPEED +/– and press SHIFT ▶.



6 Set the stop hour by pressing REC/PLAY SPEED +/– and press SHIFT ▶



7 Set the stop minute by pressing REC/PLAY SPEED +/– and press SHIFT ▶.



8 Set the recording speed by pressing REC/PLAY SPEED +/– and press SHIFT ▶

9 Select Y (yes) to execute the timer recording by pressing REC/PLAY SPEED +/–.

If you want to preset other settings, repeat steps 3 to 9.

10 When you have completed all the settings, press PAGE until the normal display appears.

11 Insert the cassette.

12 Set TIMER REC to ON.
The VCR turns off automatically, and enters the timer recording standby mode. The ⏲ indicator appears in the display window.
When no cassette is inserted. The ⏲ indicator flashes.

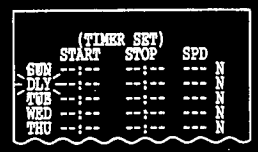
When the ⏲ indicator appears in the display window, the buttons except TIMER REC does not work.

Daily Recording

You can preset the timer to start recording each day of the week.

1 Move the flashing to the appropriate day of the week by pressing SHIFT ▼.

2 Set the day to DLY by pressing REC/PLAY SPEED +/– before setting the hour position of START in step 3.



When the time set in the STOP section is earlier than the time set in the START section

The STOP time is assumed to be for the next day, and the T (tomorrow) indicator is displayed before the stop time.

Timer recording is interrupted when the power is interrupted

When a period of the power interruption is shorter than the power backup time (within 15 days) and within the timer end time, the recording is resumed after the power is restored. The P indicator lights in the display window to show that the timer recording is interrupted. (To clear the P indicator, press PL RESET on the front panel. See page 11.)

To stop the timer recording

Set TIMER REC to OFF. The recording stops and the power is turned off.

Timer Recording

Changing/Cancelling the Timer Settings

When ⏲ indicator lights in the display window, set TIMER REC to OFF to clear it.

Changing the timer settings

1 Press PAGE until the TIMER SET display appears on the screen.

2 Press SHIFT ▶ or ▼ to move the flashing to the position where you want to change.

3 Press REC/PLAY SPEED +/– to change the setting.

4 Press PAGE until the normal display appears.

Cancelling the timer setting

1 Press PAGE until the TIMER SET display appears on the screen.

2 Press SHIFT ▼ to move the flashing to the position where you want to cancel.

3 Press SHIFT ▶ to move the flashing to the timer execution.

4 Press REC/PLAY SPEED +/– to set the timer execution to N.

5 Press PAGE until the normal display appears.

Cancelling all timer settings

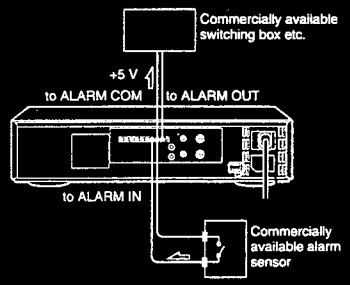
1 Press PAGE until the TIMER SET display appears on the screen.

2 Press AL RESET.

Alarm Recording

You can use a door switch or alarm sensor to trigger alarm recording. You can make alarm recording in recording mode, stop mode and power off mode.

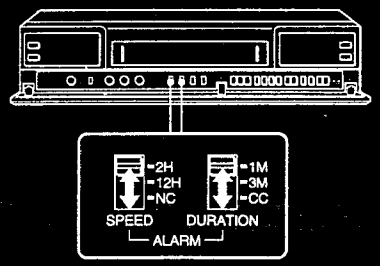
Connecting an Alarm Sensor



Setting the Alarm Speed and Duration

You can set the ALARM SPEED as follows:
2H: for recording in two hour mode
12H: for recording in 12 hour mode
NC: for recording at the same speed as before the alarm was received

You can set the ALARM.DURATION as follows:
1M: for recording for one minute
3M: for recording for three minutes
CC: for recording as long as the alarm signal is being input (or for at least five seconds)



Notes

- While alarm recording is in progress, other modes are inoperable.
- If an alarm signal is received while the power is off, the VCR is not turned off after the alarm recording is performed.
- If an alarm input is received while the VCR is in auto repeat recording, auto repeat recording stops and the REPEAT indicator goes off. After the tape reaches the end, the tape is rewound and the VCR stops. The OFF indicator lights in the display window.

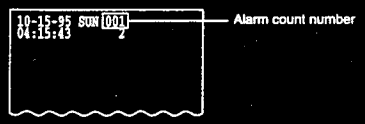
When the OFF indicator lights, in order to prevent accidental erasure of a recorded tape, timer recording and alarm recording cannot be executed.
If any of ● REC, ►► FF, ◄◄ REW, ► PLAY is pressed, the OFF indicator goes off.

- If another alarm is received while alarm recording is in progress, the second alarm is ignored.
- If the power is interrupted while alarm recording is in progress and restored again, the operation before the alarm recording was made resumes.

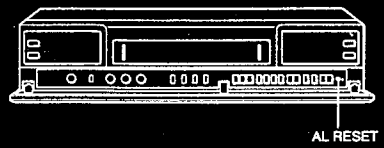
Indicators during alarm recording

The AL indicator flashes in the display window.

The count (left digit) of the alarm recording flashes on the monitor screen.
The alarm recording can be counted up to 999.
When the alarm function has worked 1000 times, the count number returns to 000.

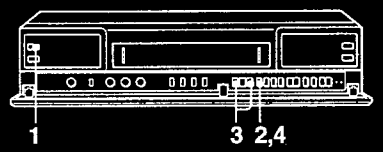


To reset the alarm count



Press AL RESET. The count on the screen are reset to 000.

Scanning the Picture of the Alarm Recordings — Alarm Scan



1 Turn on the power of the equipment to be used.

2 Press II PAUSE/AL SCAN in stop mode.
The AL SCAN lights in the display window or on the monitor screen.

In the display window

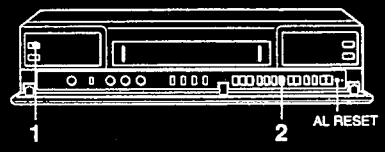
On the monitor screen

3 Press ►► FF or ◄◄ REW.
The portions where the alarm function worked are subsequently played back for five seconds one by one.

4 Press II PAUSE/AL SCAN to view a certain scene longer.
Press ■ STOP to release alarm scan mode.

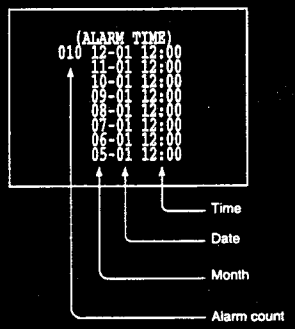
Note
If the tape reaches the end during scanning, the tape is rewound and the VCR stops at the beginning of the tape.

Displaying the Alarm List — Alarm Recall



1 Turn on the power of the equipment to be used.

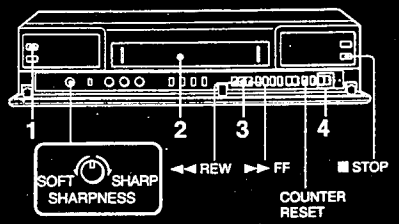
2 Press PAGE until the ALARM TIME display appears on the screen.
The alarm count, date and time are displayed.
The date and time are displayed up to recent eight times.



To turn off the alarm list on the screen
Press PAGE until the normal display appears.

To reset the alarm count in the display window
Press AL RESET.
The alarm count shows "000".

Playback



1 Turn on the power of the equipment to be used.

2 Insert the cassette.

3 Select the playback speed by pressing REC/PLAY SPEED -/+.
The selected playback speed is displayed in the display window.

4 Press ► PLAY.
Playback starts.

To stop playback
Press ■ STOP.

To rewind the tape
Press ■ STOP and then ◄◄ REW.

To fast-forward the tape
Press ■ STOP and then ►► FF.

To adjust the sharpness of the picture
Turn SHARPNESS to SHARP for a sharper picture or to SOFT for a softer picture.

Resetting the tape counter
The tape counter in the display window helps you to locate a certain scene after playback. Press COUNTER RESET to set the counter to "0H00M00S" (counter zero) position before playing back the tape. The VCR keeps counting the length of the tape being played back. Note, however, that the tape counter will not count the portions without video signals.

Note
You cannot play back the tapes recorded on other time-lapse VCR on this VCR and vice versa.

Audio Playback

You can play back the sound with the picture.
Play back the tape at the same speed at which it was recorded so that you can monitor the sound normally.

For audio playback in 2-hour mode
Play back the tape normally.

For audio playback in 12-hour or 24-hour mode
Press II►ADV/AUDIO ON in playback mode.
"A12" or "A24" is displayed in the display window.
To turn off the sound, press II►ADV/AUDIO ON again.

Note
Noise appears on the screen and the sound is distorted when you play back the picture in 12- or 24-hour mode.

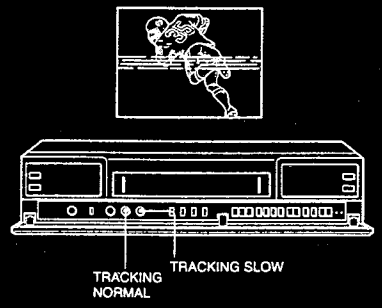
Playback speed
You can view the playback picture at one of the following speeds.

Recording speed (H)	Playback speed (H)							
	2	12	24	48	72	96	120	168
2	1	1/6	1/12	1/24	1/36	1/48	1/60	1/84
12	6	1	1/2	1/4	1/6	1/8	1/10	1/14
24	12	2	1	1/2	1/3	1/4	1/5	1/7
48	24	4	2	1	2/3	1/2	2/5	2/7
72	36	6	3	3/2	1	3/4	3/5	3/7
96	48	8	4	2	4/3	1	4/5	4/7
120	60	10	5	5/2	5/3	5/4	1	5/7
168	84	14	7	7/2	7/3	7/4	7/5	1

For example, when a tape recorded in 120-hour mode is played back in 12-hour mode, you can view the playback picture at a speed 10 times faster than the recorded one.

Adjusting Pictures

If streaks or noise bands appear on the playback picture, adjust the tracking condition.

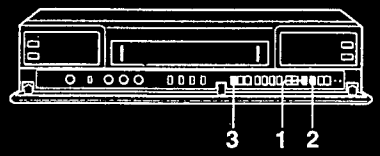


For the picture recorded in 2-hour mode: Use TRACKING NORMAL.

For the picture recorded in 12- to 168-hour mode: Use TRACKING SLOW.

Locating the Counter Zero Point

The VCR can memorize the counter zero point and can automatically stop at that point. Thus, you can search for a desired point quickly during playback.



1 During playback or recording, press COUNTER RESET at the point you want to locate later.
The counter in the display window shows "0H00M00S".

2 After playback or recording, press COUNTER MEMORY so that the M indicator appears in the display window.

In the display window

3 Press ◄◄ REW.
The VCR rewinds the tape and stops automatically at the position close to the counter zero point.

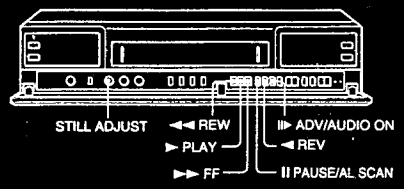
If you press ◄◄ REW again, the VCR shows a negative counter value. To locate the counter zero point, press ►► FF.

To cancel the memory of the counter zero point
Press COUNTER MEMORY again.

Notes
- The counter does not work for unrecorded portions of a tape.
- The counter works as a linear time counter only where the recording is 2-hour mode, indicating the tape movement in terms of hours, minutes and seconds.
  For other recording speeds, the counter reflects the ratio of the recording speed to that of 2-hour mode. For example, in 12-hour mode, each second on the counter reflects six actual seconds (12/2=6).
- There may be a slight discrepancy between the position shown on the tape counter and the actual tape position.
- If ● REC is pressed, the memory of the counter zero point is cleared.

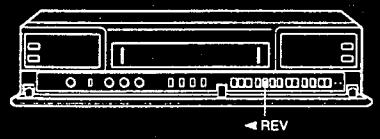
Various Playback Modes

You can play back picture at various modes: reverse playback, still and field by field pictures, and high-speed playback in both forward and reverse directions.



Reverse Playback

During playback, keep pressing ◄REV. Reverse playback picture appears on the screen.



In the display window

Note
During reverse playback, streaks appear on the monitor screen.

Still Picture

During playback, press II PAUSE/AL SCAN.
To resume normal playback, press II PAUSE/AL SCAN or ► PLAY.
When the still mode lasts for more than approximately five minutes, the VCR will automatically enter the playback mode.

If the picture shakes while in the still mode
Adjust the picture with STILL ADJUST.

Field-by-Field Picture

In the still mode, press II►ADV/AUDIO ON.
Each time you press the button, the picture advances by one field.

In the display window

Picture Search

During playback, press ►► FF (forward direction) or ◄◄ REW (reverse direction). A high-speed picture (about five times the normal speed in 2-hour mode) without sound appears on the monitor screen.
To resume normal playback, press ► PLAY.

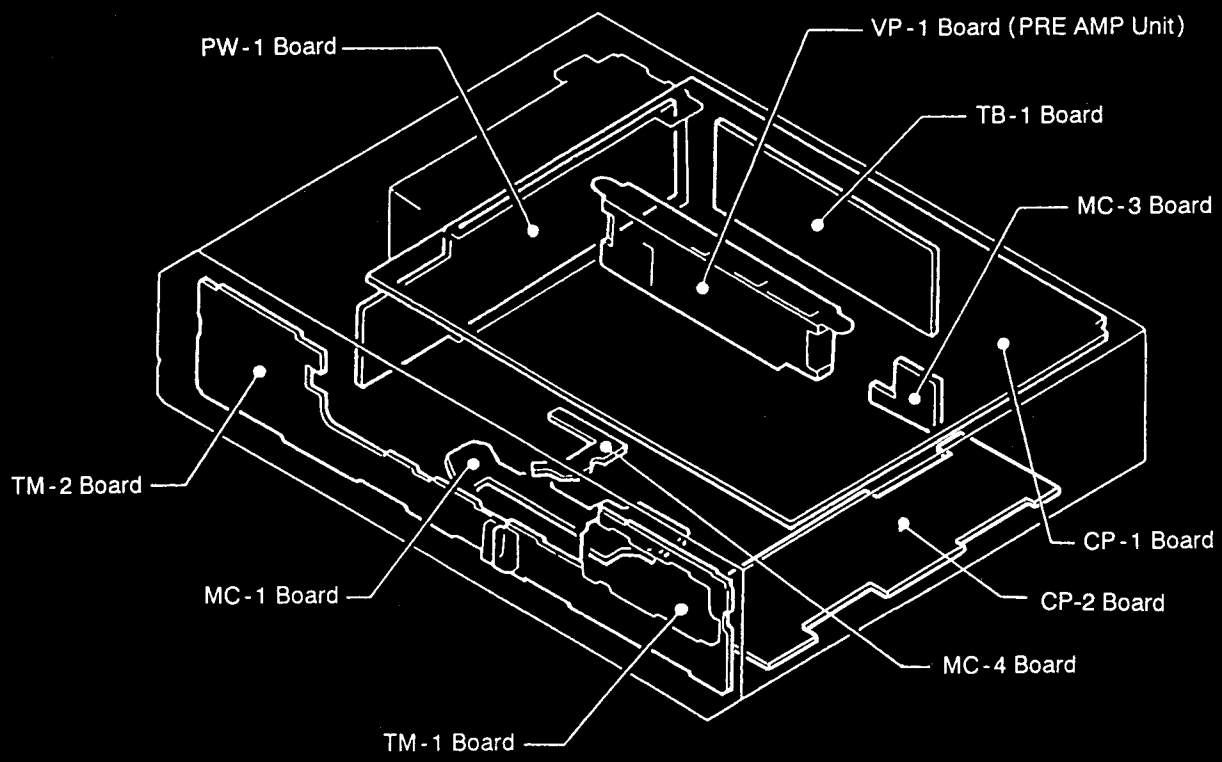
When ►► FF is pressed / When ◄◄ REW is pressed

In the display window

Note
During picture search, streaks or noise band appear on the monitor screen.

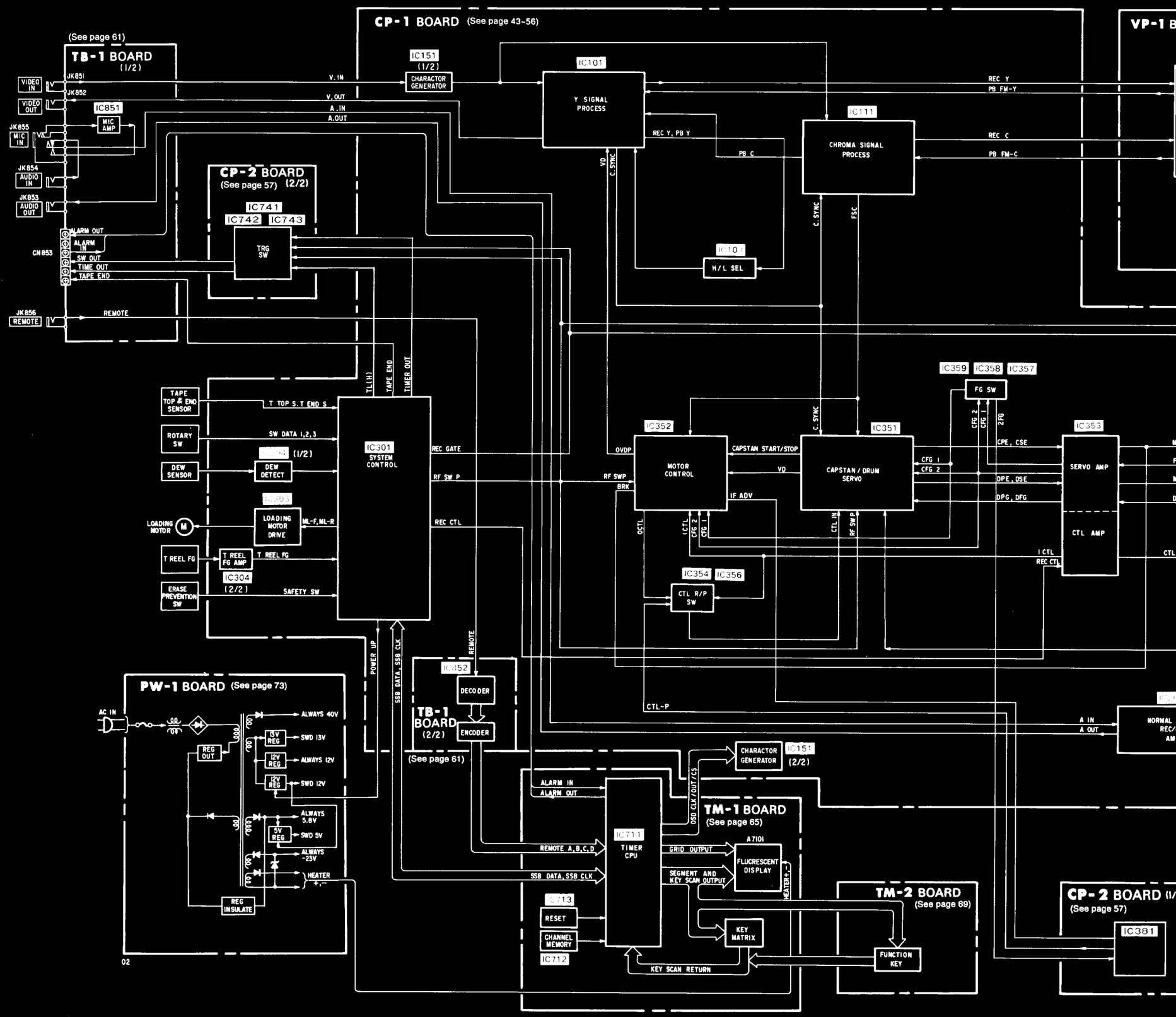
SECTION 3
DIAGRAMS

CIRCUIT BOARDS LOCATION

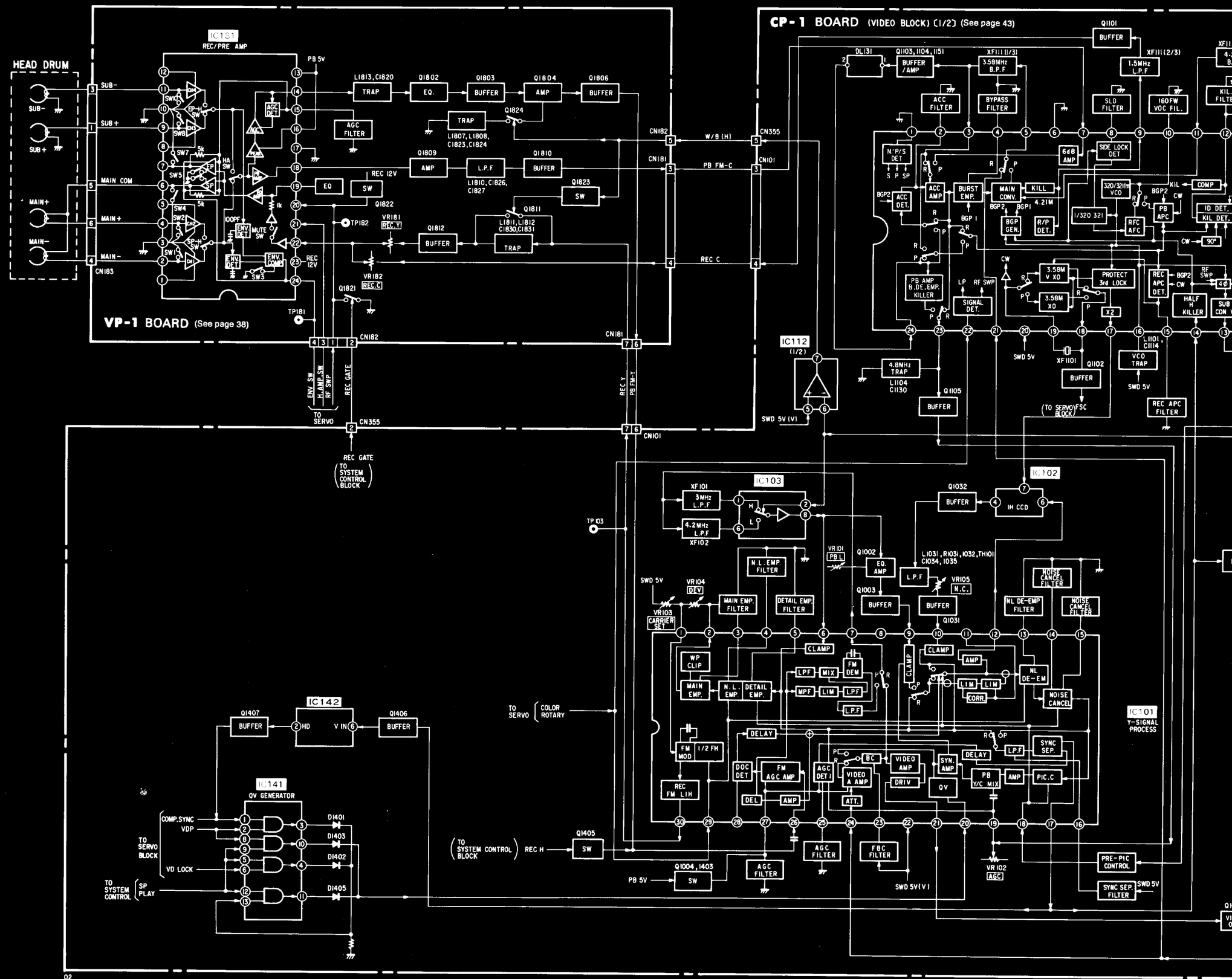


Note: CP-1 board contains VD-A, SY-A, SV-A, AD-A and TM-A boards.

OVERALL WIRING DIAGRAM



VIDEO CIRCUIT BASIC BLOCK DIAGRAM



SERVO BASIC BLOCK DIAGRAM

CP-1 BOARD (SERVO BLOCK)

(See page 47)

IC351 DRUM/CAPSTAN SERVO

TO SYSTEM CONTROL: O/I CLK, O/I DATA, SV CLK, SV DATA, REC REF

RF SWP (CP-2 BOARD CN742 (11) pin)

(TO VIDEO) COMP SYNC

ENV SW

Q3502 SW, Q3501 SW, Q3503 SW, D3504, D3503, VR353 (NOR TRK)

Q3520 SW, Q3522 SW, Q3521 SW

SWD 5V (SV)

AUTO TRACKING

IC351 pins: 37 O/I CLK, 38 O/I DATA, 39 SCLK, 40 S DATA, 9 REC CTL, 3 RF-SW, 46 C-SYNC, 44 FSC, 47 ENV SW, 29 SLOW-CR, 30 TRK-CR, 31 D-PH, 32 D-WD 1, 33 D-WD 2, 11 DPG MM, 22 F/R OUT, 18 C START/STOP, 17 CAP-P, 26 SP OUT, 20 CSE, 21 CPE, 24 CFG2, 23 CFG1, 14 DSE, 16 DPE, 13 DFG, 12 DPG, 10 D-P, 39 MODE OUT, 8 REMARK, 35 S/S, 7 CTL IN, 27 SP OUT, 1 ROTARY, 2 HA-SW, 48 VD, 28 MC BR

Q3511, D/A CONV. LPF (×4)

IC359 (1/2) FG SW, IC358 (2/4), IC359 (2/2), IC358 (1/4), IC357

D3502 FF+REW (TO SYSTEM CONTROL), D3501 60 PWM (TO SYSTEM CONTROL), FG SW (TO SYSTEM CONTROL)

Q3504, D3517, D3519

TO SYSTEM CONTROL: CTL R/P, RVS H, H COMP, REC CTL, CAP FG, SL + ST, F ADV P

TP351

IC356 (1/3), D3531, INDEX (TO SYSTEM CONTROL)

IC352 pins: 35 IROT, 34 IHAS, 37 IVDP, 30 IMIRR, 38 ISLST, 41 IFADV, 32 SWP, 1 FSC, 2 FSCR, 4 OHAS, 7 VLP, 8 OROT, 9 OVDP, 18 CFG2, 17 CFG1, 15 ICTL, 31 OCTL, 24 START, 19 SS OUT, 20 BRK, 16 MCFR, 11 MMCR I

D3533, IC354 (2/2), D3534, Q3512 SW, IC356 (3/3), IC354 (1/2)

Q3505, IC358 (3/4), SWD 5V (SV)

ENV SW, RF SWP, H AMP SW → CN355 → TO VIDEO

FSC, VD LOCK, COLOR ROTARY, VDP → TO VIDEO

D3520, 3521 RESET, SWD 5V (SV), D3522, REC H (TO SYSTEM CONTROL), Q3513 SW, SWD 5V (SV) VR354, SW PHASE

IC356 (2/3), IC358 (4/4), D3515, D3514

Q3514 SW

IC352 MOTOR CONTROL

(See page 69)

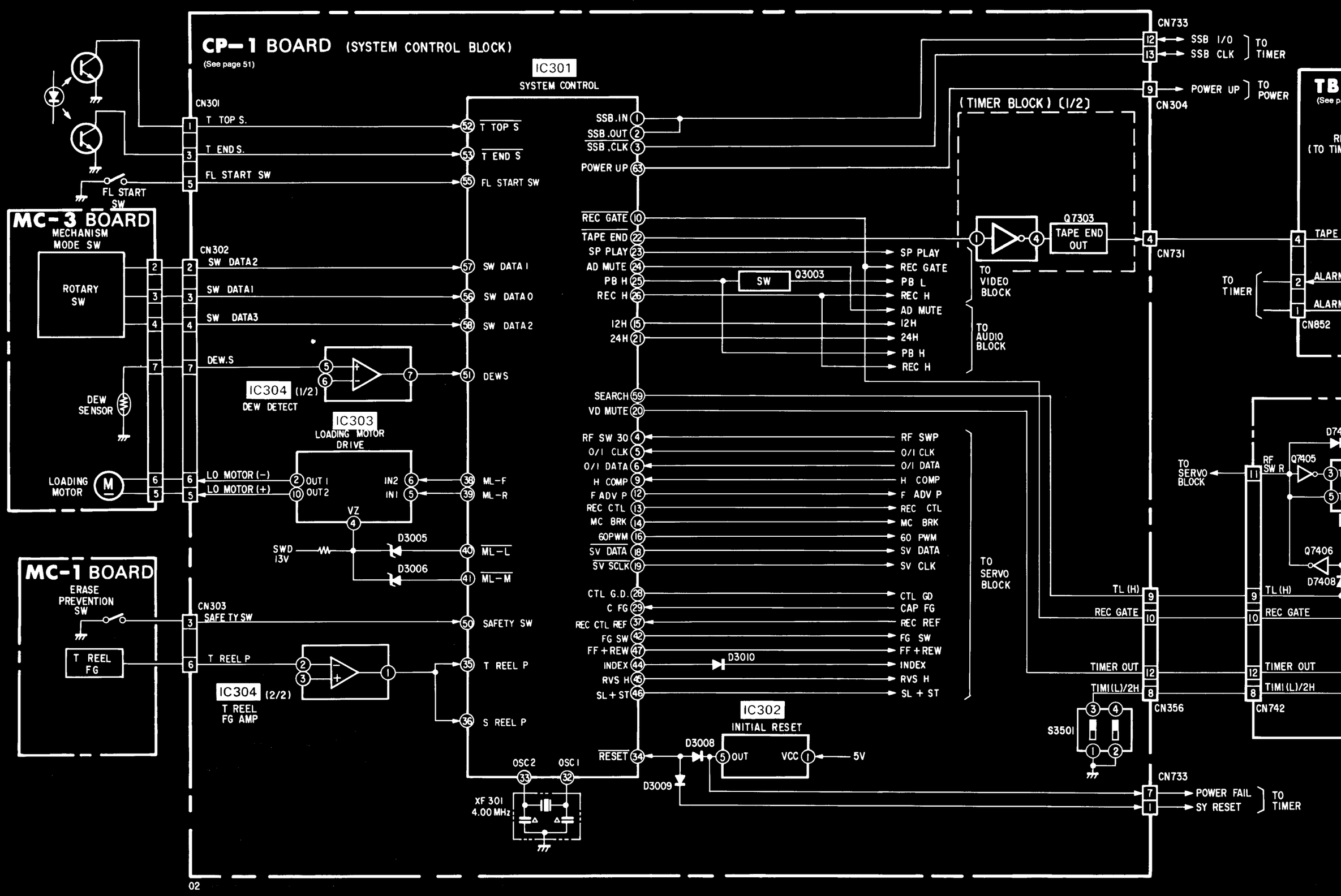
TM-2 BOARD: CN1 SL TRK(+), SL TRK(-), TRK(+), TRK(-) → CN351; VR723 SLOW, VR722 NORMAL (TRACKING)

(See page 69)

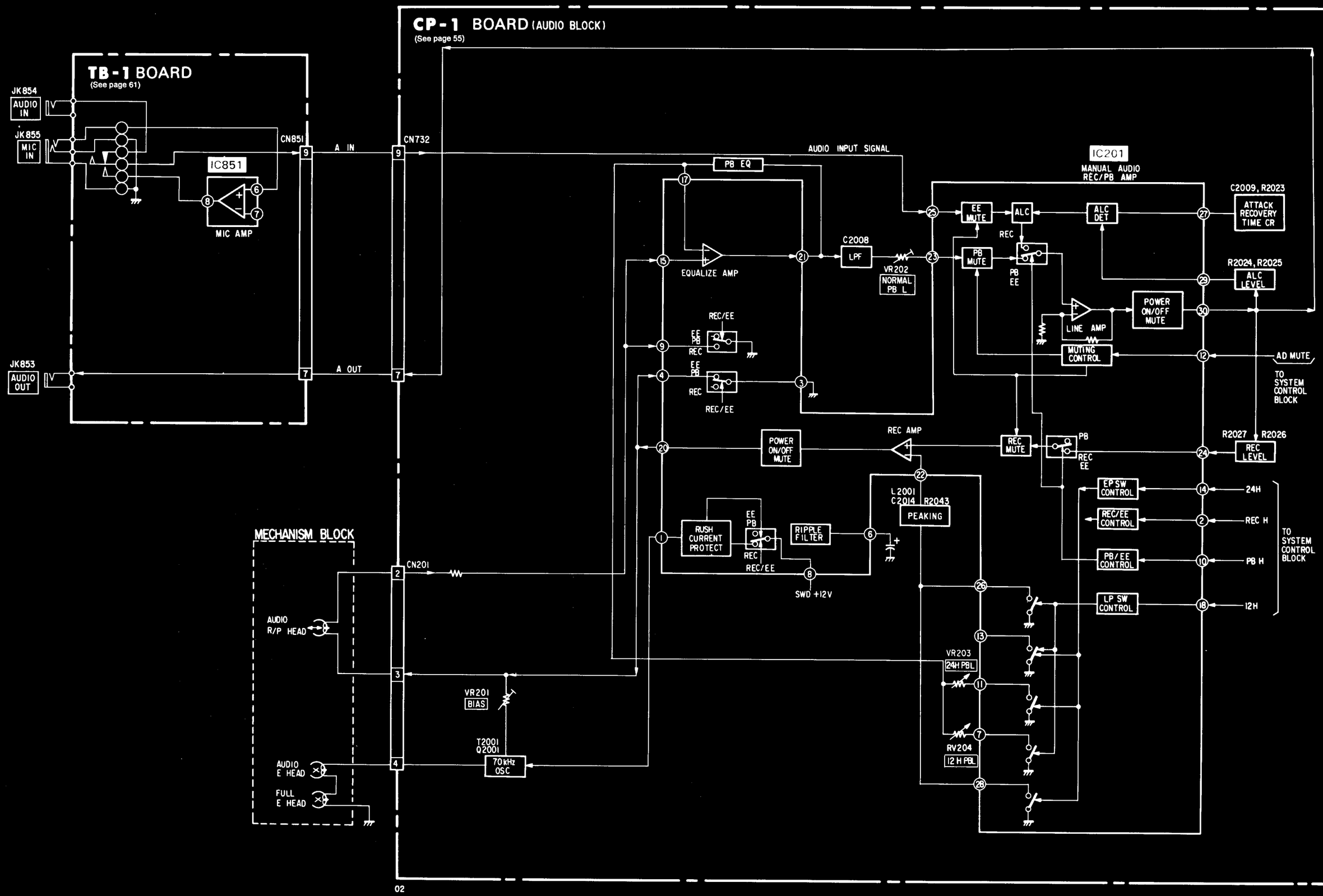
TM-2 BOARD: VR724 STILL ADJUST, CN1 → CN351 V-LOCK, V-LOCK → SWD 5V (SV)

02

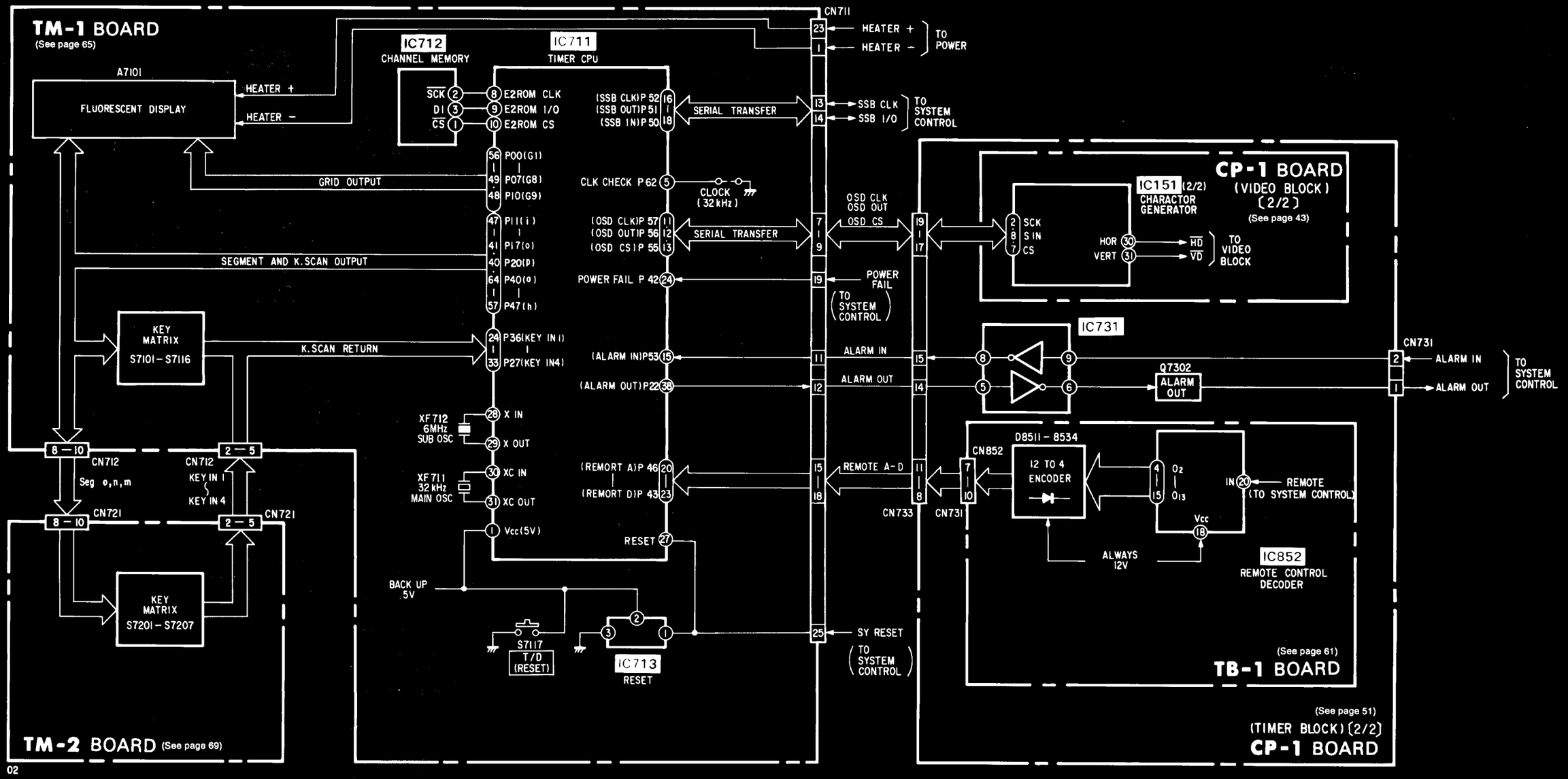
SYSTEM CONTROL BASIC BLOCK DIAGRAM



AUDIO CIRCUIT BASIC BLOCK DIAGRAM

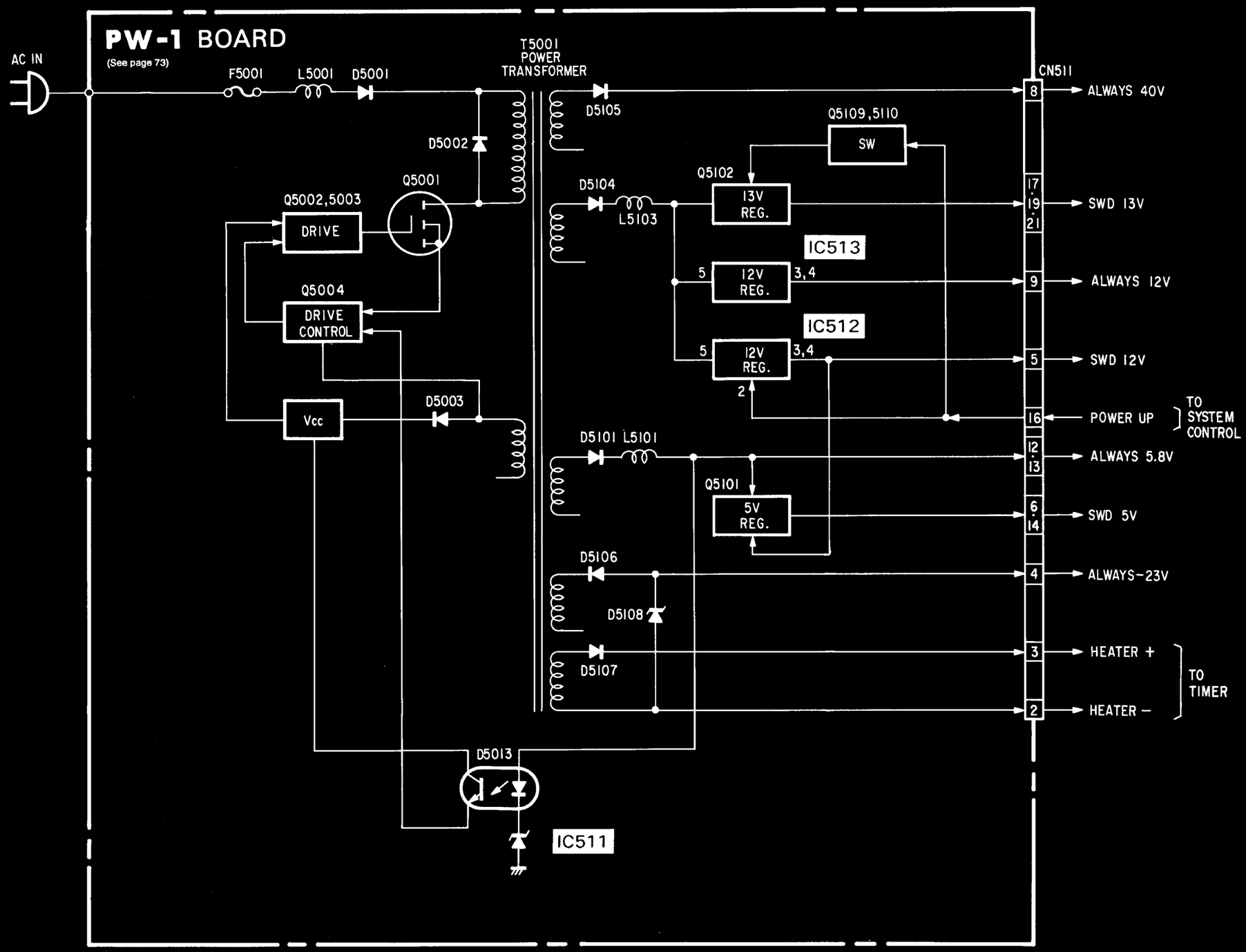


TIMER CIRCUIT BASIC BLOCK DIAGRAM



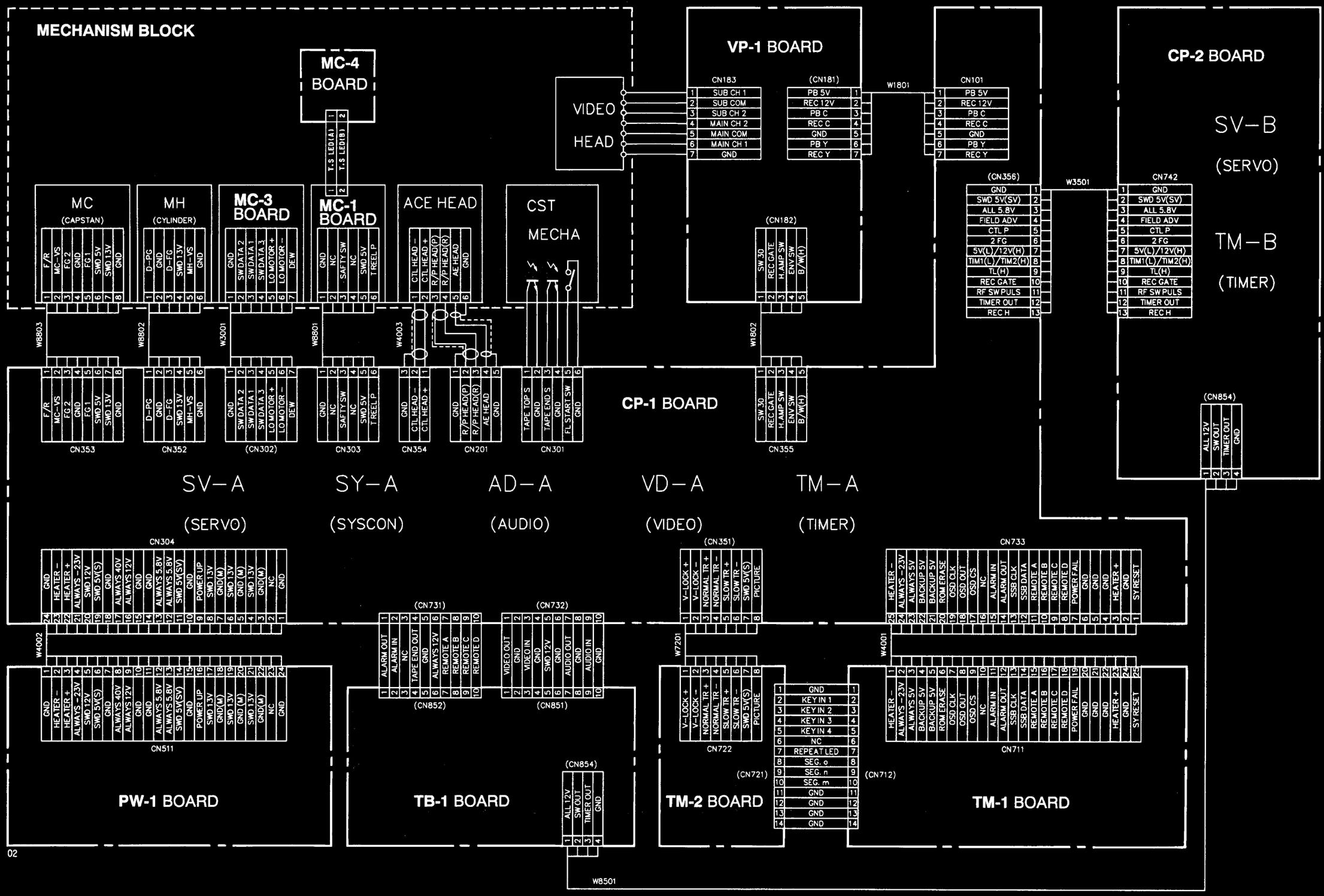
02

POWER SUPPLY CIRCUIT BASIC BLOCK DIAGRAM



SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

FRAME SCHEMATIC DIAGRAM



PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

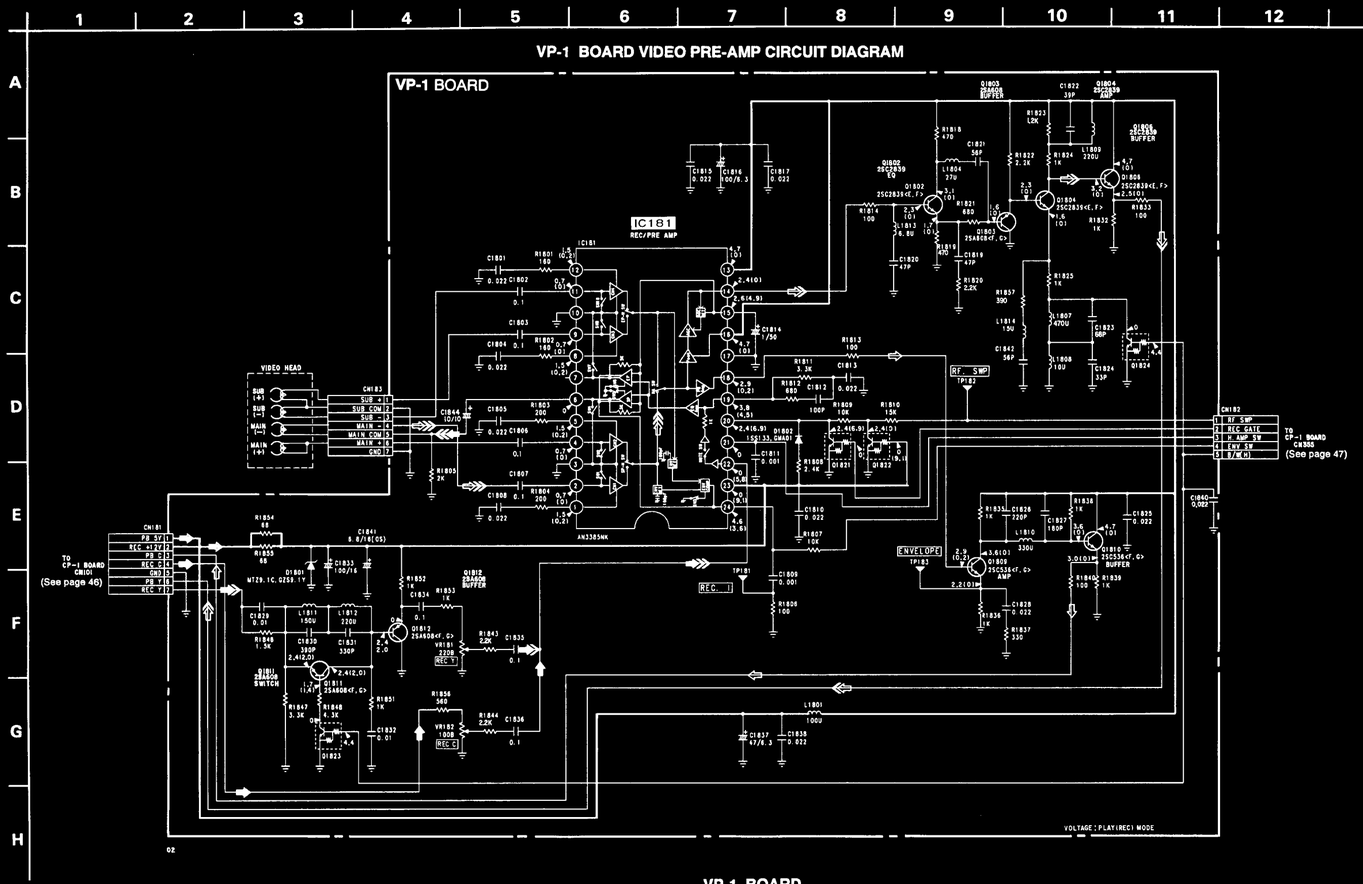
- **For printed wiring boards.**
- ○— : indicated a lead wire mounted on the component side.

- **For schematic diagrams.**
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minuts side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms. 1/4W unless otherwise noted.
  Chip resistor are 1/10W unless otherwise noted.
  kΩ : 1000Ω , MΩ : 1000kΩ .
- All capacitors are in μF unless otherwise noted. pF: μ μ F.
  50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ⊣FW⊢ : nonflammable resistor.
- ▭ : panel designation.
- ▭ : adjustment for repeair.
- ——— : B+Line
- - - - : B-Line
- ⇨ : IN/OUT direction of (+, -) B LINE.
- Circled numbers refer to waveforms.
- Voltages are dc between ground and measurement points.
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltages are taken with a VOM (Input impedance 10MΩ).
- Voltage variations may be noted due to normal production tolerances.

Note:	**Note:**
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safty. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une piéce portant le numéro spéci-fié.

When indicating parts by reference number, please include the board name.

VP-1 BOARD VIDEO PRE-AMP CIRCUIT DIAGRAM

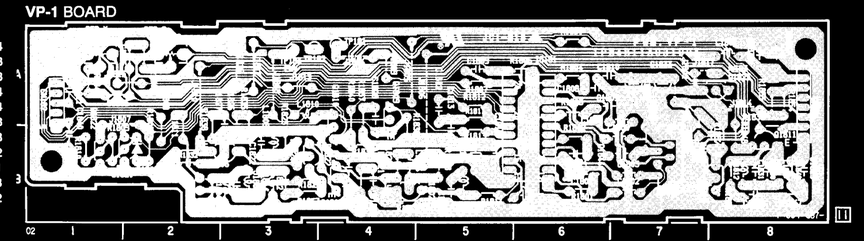


VP-1 BOARD

VP-1 BOARD

CN181	A-8	Q1803	B-4
CN182	A-1	Q1804	B-3
CN183	B-7	Q1805	B-3
		Q1809	A-4
D1801	A-7	Q1810	A-4
D1802	B-2	Q1811	B-8
		Q1812	B-8
IC181	A-6	Q1821	B-2
		Q1822	B-1
Q1802	B-4	Q1823	A-8
		Q1824	B-2

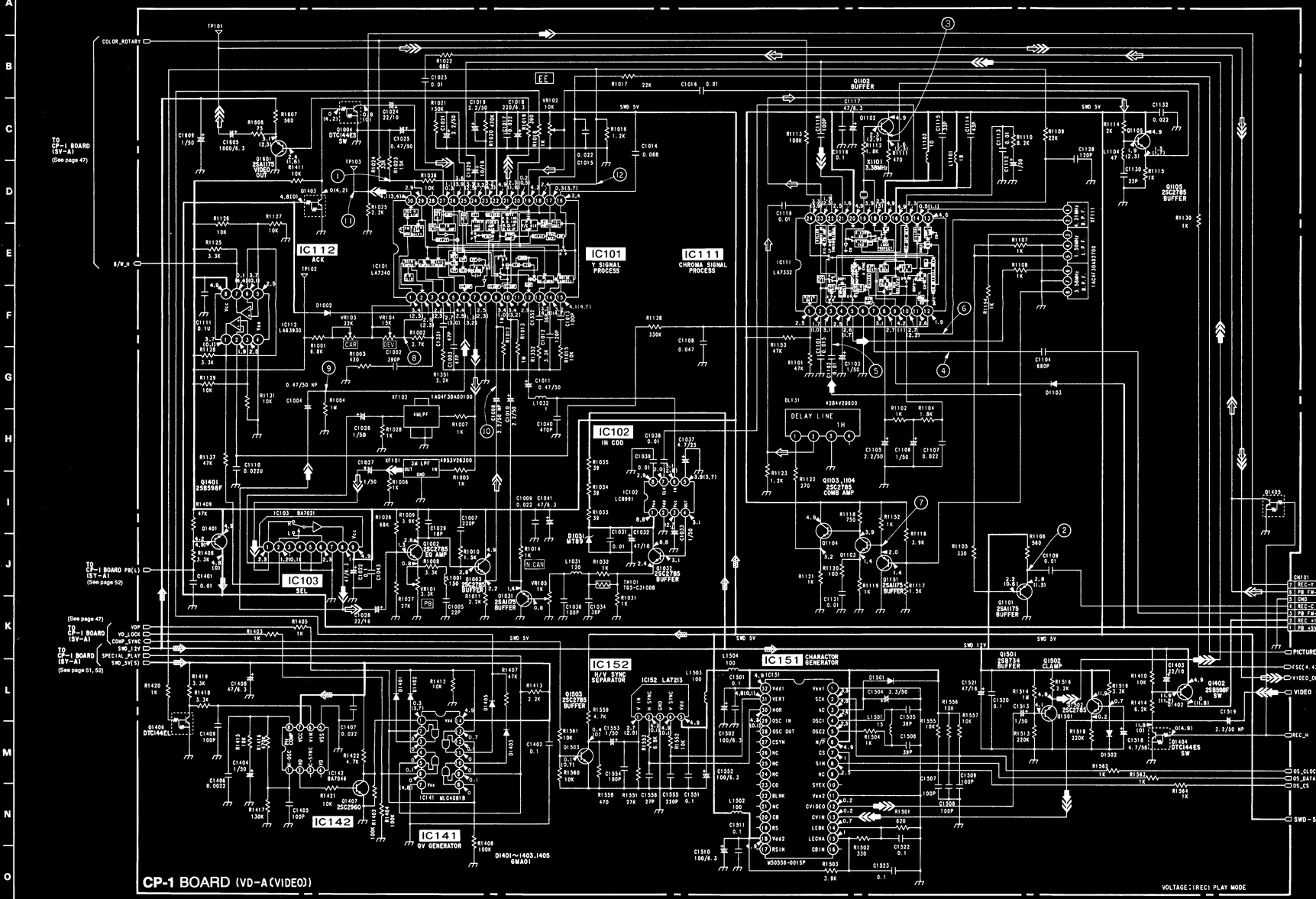
VP-1 BOARD



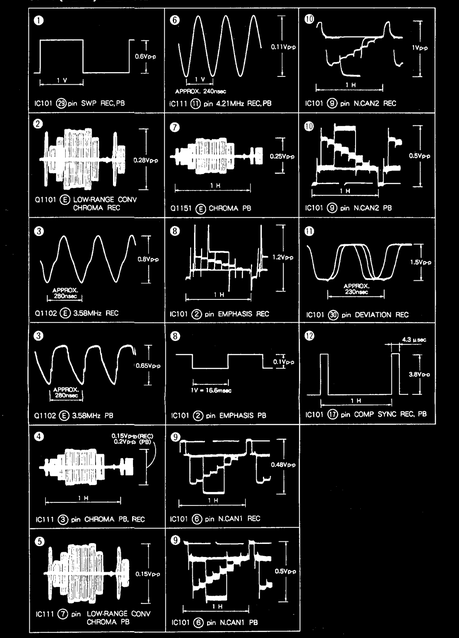
- Signal path

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡	➡	
PB	⇨	⇨	⇨	

CP-1 BOARD (VD-A) VIDEO CIRCUIT DIAGRAM

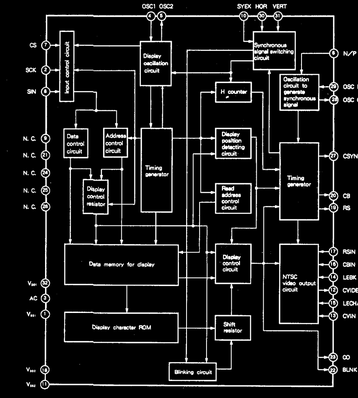


CP-1 (VD-A) BOARD


IC101 ㉔ pin SWP REC,PB
IC111 ⑪ pin 4.21MHz REC,PB
IC101 ⑧ pin N.CAN2 REC
Q1101 Ⓔ LOW.RANGE CONV CHROMA REC
Q1151 Ⓒ CHROMA PB
IC101 ⑨ pin N.CAN2 PB
Q1102 Ⓔ 3.58MHz REC
IC101 ㉑ pin EMPHASIS REC
IC101 ㉕ pin DEVIATION REC
Q1102 Ⓔ 3.58MHz PB
IC101 ㉒ pin EMPHASIS PB
IC101 ⑰ pin COMP SYNC REC, PB
IC111 ③ pin CHROMA PB, REC
IC101 ⑥ pin N.CAN1 REC
IC111 ⑦ pin LOW.RANGE CONV CHROMA PB
IC101 ⑤ pin N.CAN1 PB

• IC BLOCK DIAGRAMS

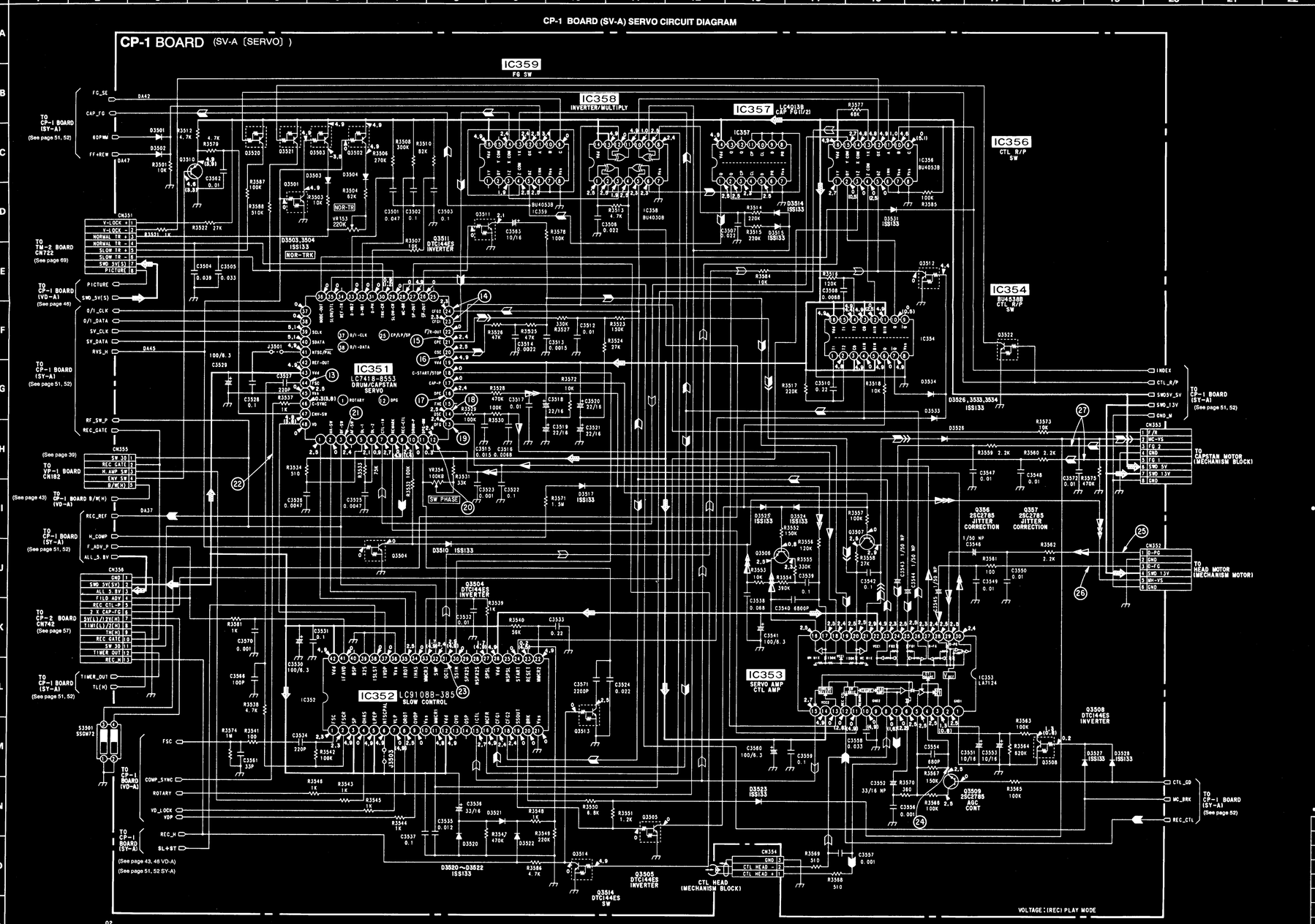
IC151 M50556-001SP



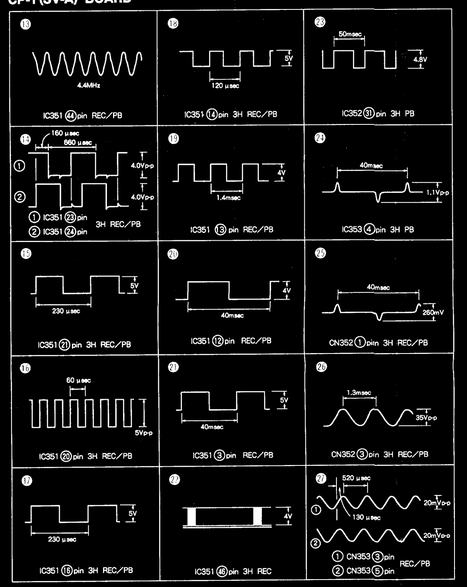
• Signal path

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡	➡	
PB	⇨	⇨	⇨	

CP-1 BOARD (SV-A) SERVO CIRCUIT DIAGRAM

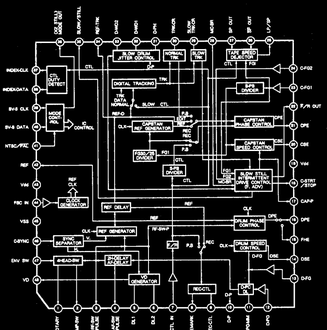


CP-1 (SV-A) BOARD

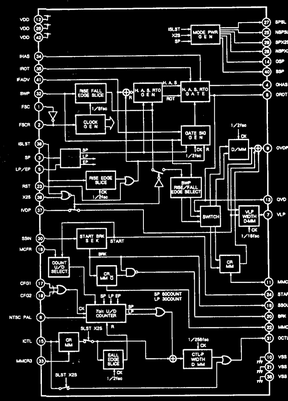

IC351 ㊹pin REC/PB
IC351 ⑭pin 3H REC/PB
IC352 ㉛pin 3H PB
IC351 ㉓pin 3H REC/PB
IC351 ㉔pin 3H REC/PB
IC351 ⑬pin REC/PB
IC353 ④pin 3H PB
IC351 ㉑pin 3H REC/PB
IC351 ⑫pin REC/PB
CN352 ①pin 3H REC/PB
IC351 ㉒pin 3H REC/PB
IC351 ③pin REC/PB
CN352 ③pin 3H REC/PB
IC351 ⑮pin 3H REC/PB
IC351 ㊻pin 3H REC
① IC351 ㉓pin ② IC351 ㉔pin 3H REC/PB
① CN353 ③pin ② CN353 ⑤pin REC/PB

• IC BLOCK DIAGRAMS

IC351 LC7418

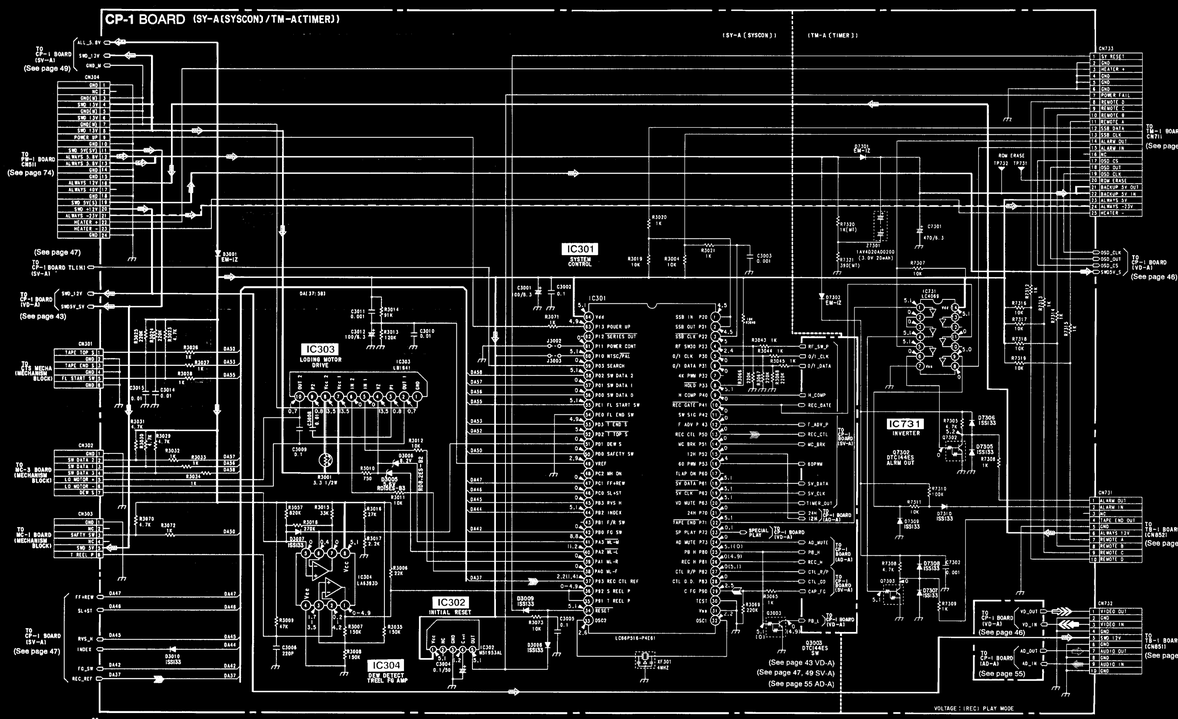


IC352 LC9108B-385



• Signal path

	REC	REC/PB	PB
Drum speed servo		▶	
Drum phase servo		▶▶	
Drum servo (speed and phase)		▶▶▶	
Capstan speed servo		▶	
Capstan phase servo		▶▶	
Capstan servo (speed and phase)		▶▶▶	
Ref. signal	▶		▷



IC301 (SYSTEM CONTROL) LC66516B-4A46

Pin No.	Terminal	I/O	Description
1	SSB IN	I	Input of serial data from timer microcomputer.
2	SSB OUT	O	Output of serial data to timer microcomputer.
3	SSB CLK	O	Output of clock signal for adjusting the timing of serial transfer to timer microcomputer.
4	RF SW 25	I	Input of head changeover signal used for timing of the servo circuit and detecting of rotation of drum.
5	0/1 CLK	I	Input of CTL pulse used for detecting of no-signal part of tape and 12-24H playback tracking.
6	0/1 DATA	I	CTL pulse "0" or "1" data (for VISS, VASS).
7	4k-PWM	O	Not use.
8	HOLD	I	Fixed at HIGH (pull-up to 5V).
9	H COMP	O	Signal output for correction of drum rotating speed in intermittent recording.
10	REC GATE	O	Signal to indicate video head recording in REC mode.
11	SW SIG	O	Pulse output every recording of one field.
12	F ADV P	O	Intermittent output of pulse synchronizing with RF SWP in each mode of STILL, F ADV, 12 – 24H REC/PLAY.
13	REC CTL	O	Output of control signal for recording.
14	MC BRK	O	Signal to indicate braking of rotation of capstan motor (MC).
15	12 H	O	"H" output in REC 2 mode 12 H RECORD and PLAY 2 mode 12 H continuous PLAYBACK.
16	60 PWM	O	Signal to switch capstan FG signal.
17	T LAP ON	O	Not use.
18	SV SDATA	O	Serial output data to SV IC.
19	SV SCLK	O	Serial output clock to SV IC.
20	VD MUTE	O	Not use.
21	24H	O	"H" output in REC 2 mode 24 H RECORD and PLAY 2 mode 24 H continuous PLAYBACK.

- Signal path

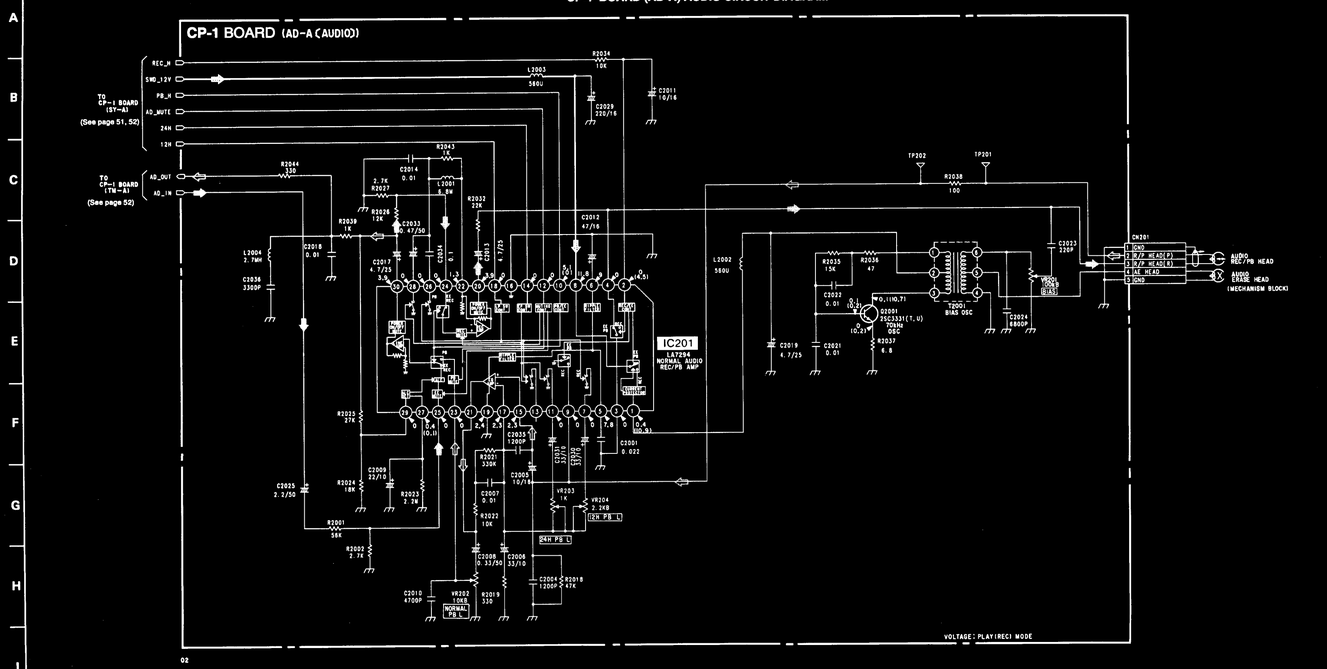
	REC	REC/PB	PB
Drum speed servo			
Drum phase servo			
Drum servo (speed and phase)			
Capstan speed servo		⇨	
Capstan phase servo			
Capstan servo (speed and phase)	⇨		
Ref. signal			

- Signal path

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC			⇨	⇨
PB			⇨	⇨

Pin No.	Terminal	I/O	Description
22	TAPE END	O	Output when T END S input in RECORD.
23	SP PLAY	O	Output in special PLAYBACK (Back and forth SEARCH, STILL, F. ADV, PLAY 3, etc.).
24	AD MUTE	O	Signal to prohibit audio output/playback output.
25	PB H	O	Output in the mode of delivering reproduced picture.
26	REC H	O	Signal to indicate record, and output in REC mode.
27	CTL R/F	O	Not use.
28	CTL G. D.	O	CTL AMP GAIN changeover signal.
29	C FG	O	Pulse of 0 – 6kHz approx. Required frequency : 1kHz.
30	TEST	I	Connected to ground.
31	Vss		Connected to ground.
32	OSC 1	I	Clock oscillation terminal.
33	OSC 2	O	Clock oscillation terminal.
34	RESET	I	Reset signal input for initializing.
35	T TEEL P	I	Pulse of 0 – 500Hz approx. The rotation of TAKE reel stand changes the cycle.
36	S REEL P	I	Not use.
37	REC CTL REF	I	Pulse of 30 (or 25) Hz. Reference signal of REC CTL output in REC.
38	ML-F	O	Signal to indicate rotation of tape loading motor (ML) in normal direction.
39	ML-R	O	Signal to indicate rotation of tape loading motor (ML) in normal direction.
40	ML-L	O	Signal to indicate low speed rotation of tape loading motor (ML).
41	ML-M	O	Signal to indicate medium speed rotation of tape loading motor (ML).
42	FG SW	O	Capstan FG switch signal to change over frequency division.
43	F/R SW	O	Not use.
44	INDEX	O	CTL pulse changeover signal to detect VISS/VASS signal in ALARM. T/D SEARCH.
45	RVS H	O	Output of SV serial output MC-F/R as it is.
46	SL + ST	O	Output in each mode of STILL, R. STILL, PLAY 3, R-PLAY 3, F-ADV, R-F-ADV.
47	FF + REW	O	Output in FF or REW mode. (For changeover of MIX AMP GAIN).
48	MH-ON	O	Not use.
49	V REF	I	Reference voltage input for sensor comparator input.
50	SAFETY SW	I	SW to judge if the cassette is recordable or not.
51	DEW S	I	Sensor input to detect dew condensation. The input signal becomes HIGH when dew condensation is detected.
52	T TOP S	I	Sensor input to detect the beginning of tape.
53	T END S	I	Sensor input to detect the end of tape.
54	FL END SW	I	Connected to ground.
55	FL START SW	I	SW for front loading mechanism. (Changes when front loading starts.)
56	SW DATA 0	I	SW to indicate mechanism position.
57	SW DATA 1	I	SW to indicate mechanism position.
58	SW DATA 2	I	SW to indicate mechanism position.
59	SEARCH	O	Not use.
60	NTSC/PAL	I	For changeover of NTSC/PAL.
61	POWER CONT	I	For changeover of POWER ON/OFF.
62	SERIES OUT	O	Not use.
63	POWER UP	O	Output except for POWER OFF mode.
64	Vdd		5V power supply terminal.

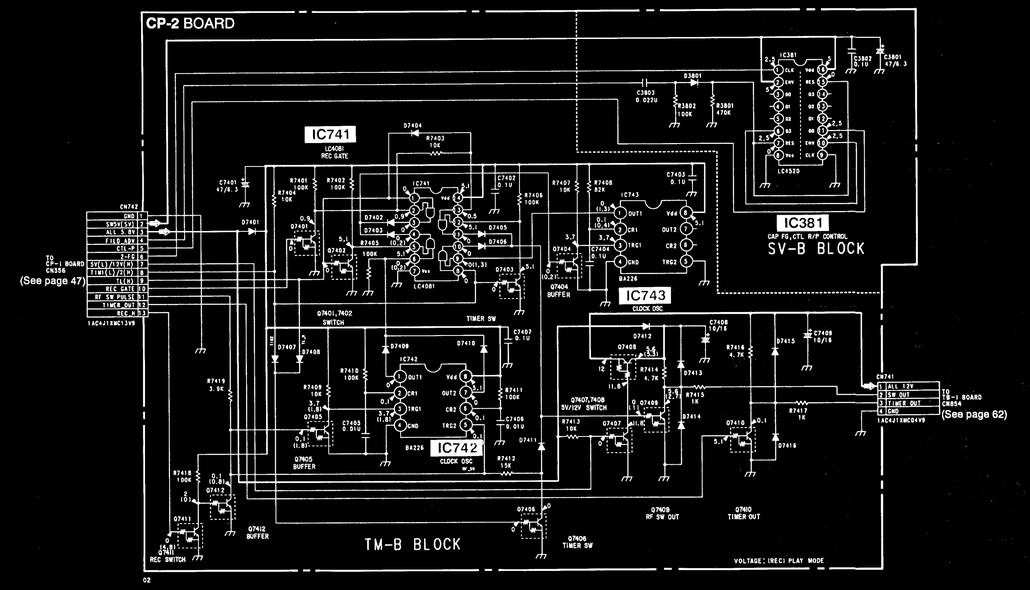
CP-1 BOARD (AD-A) AUDIO CIRCUIT DIAGRAM



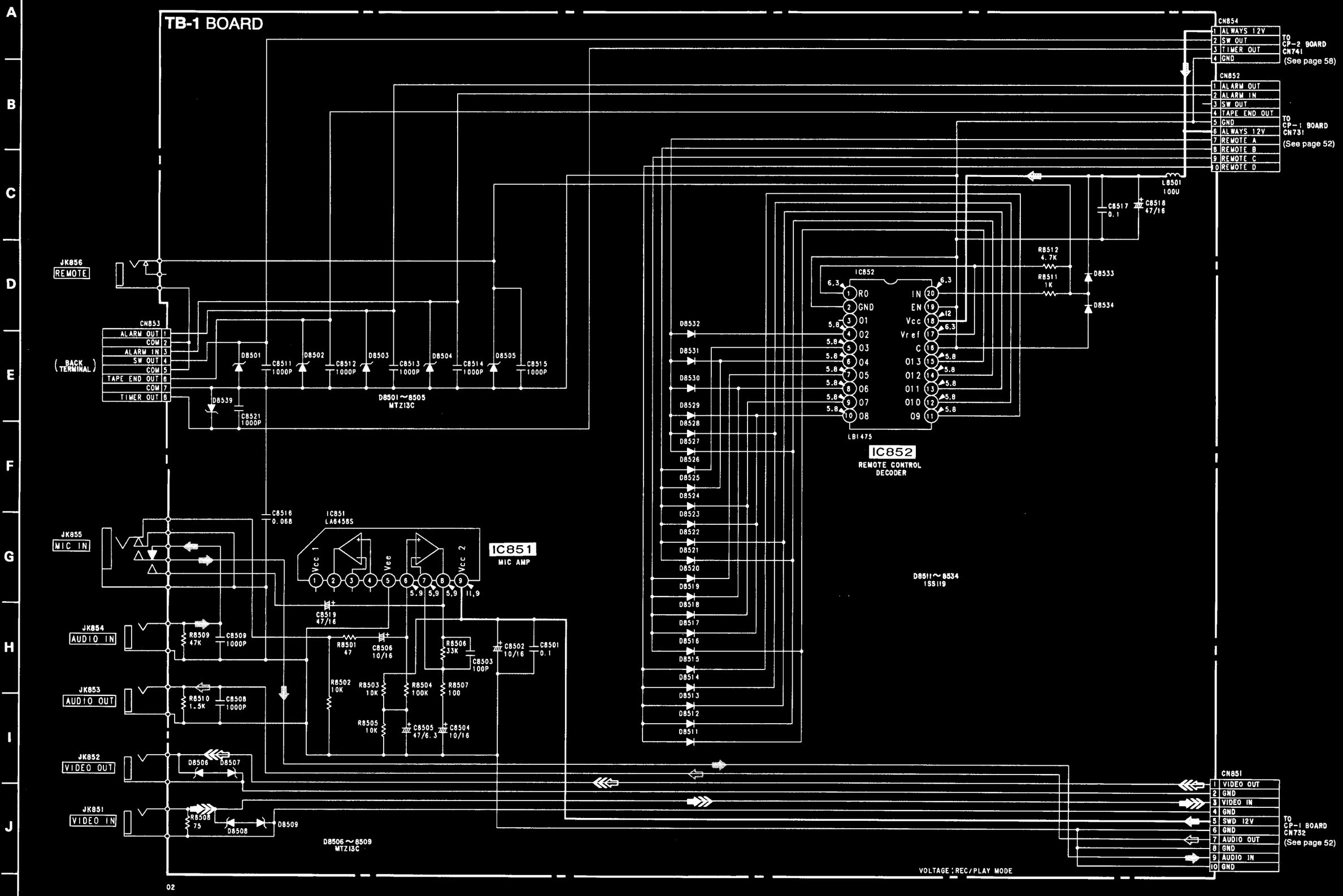
- Signal path

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC				➡
PB				⇨

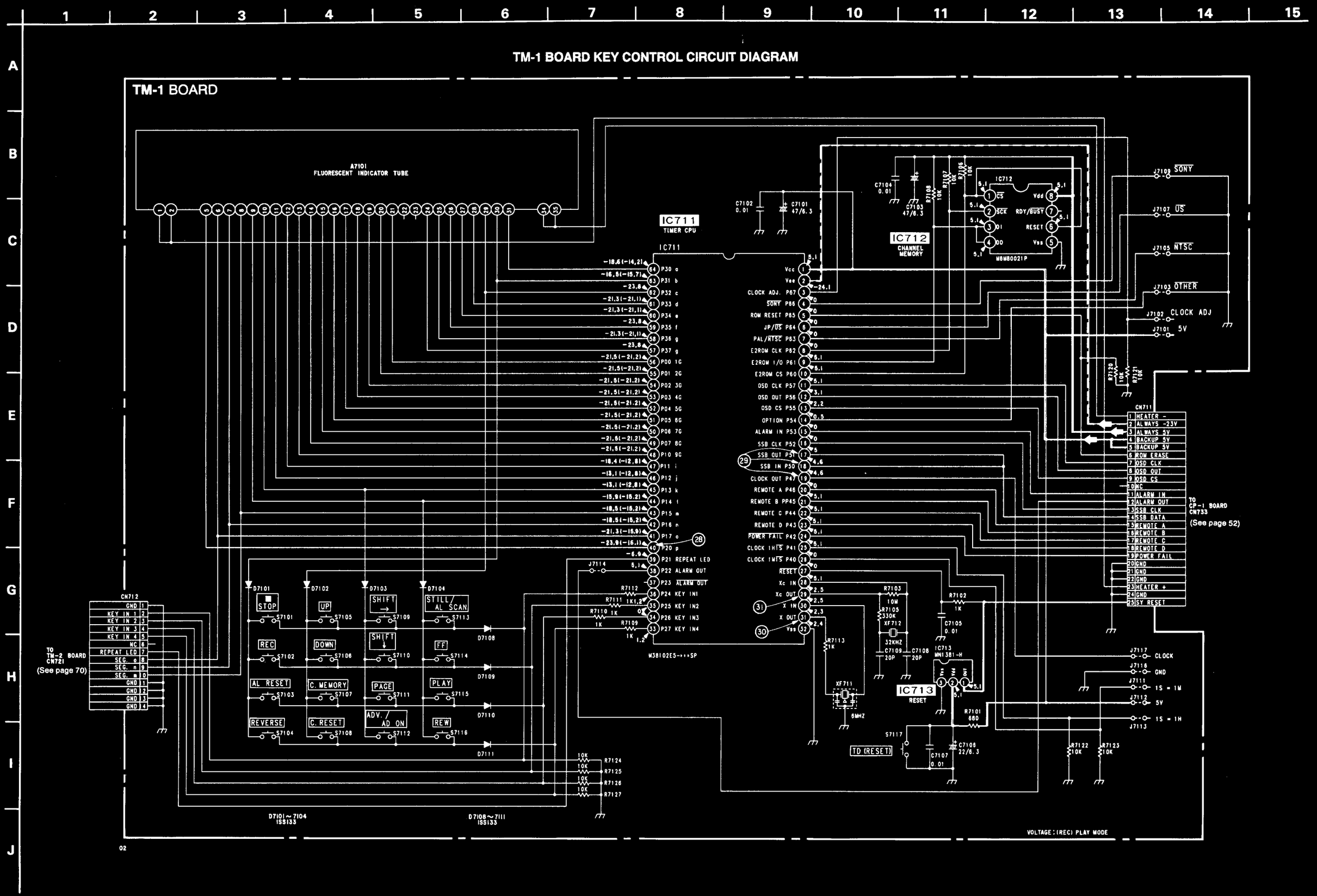
CP-2 CIRCUIT DIAGRAM



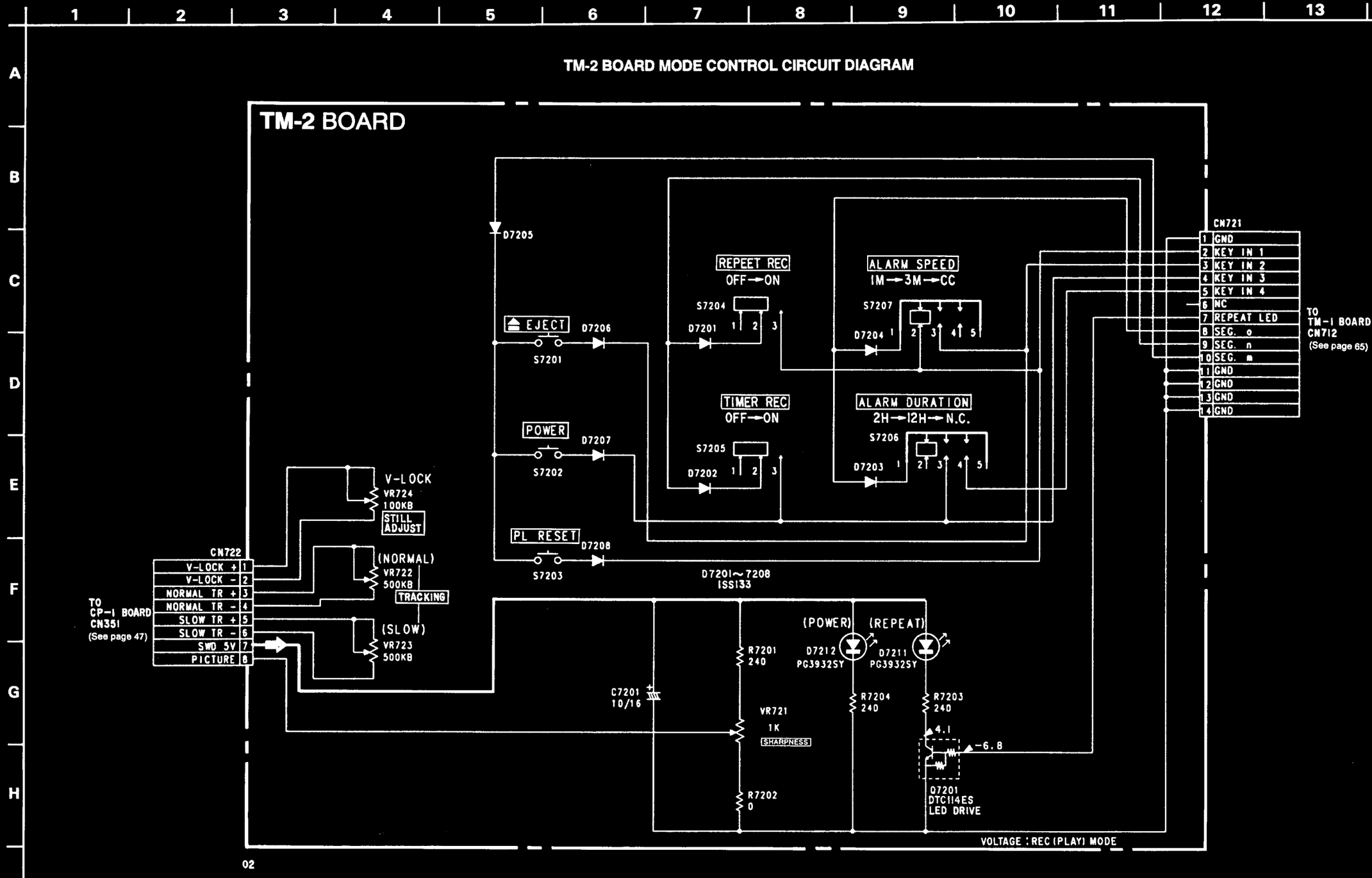
TB-1 BOARD TERMINAL CIRCUIT DIAGRAM



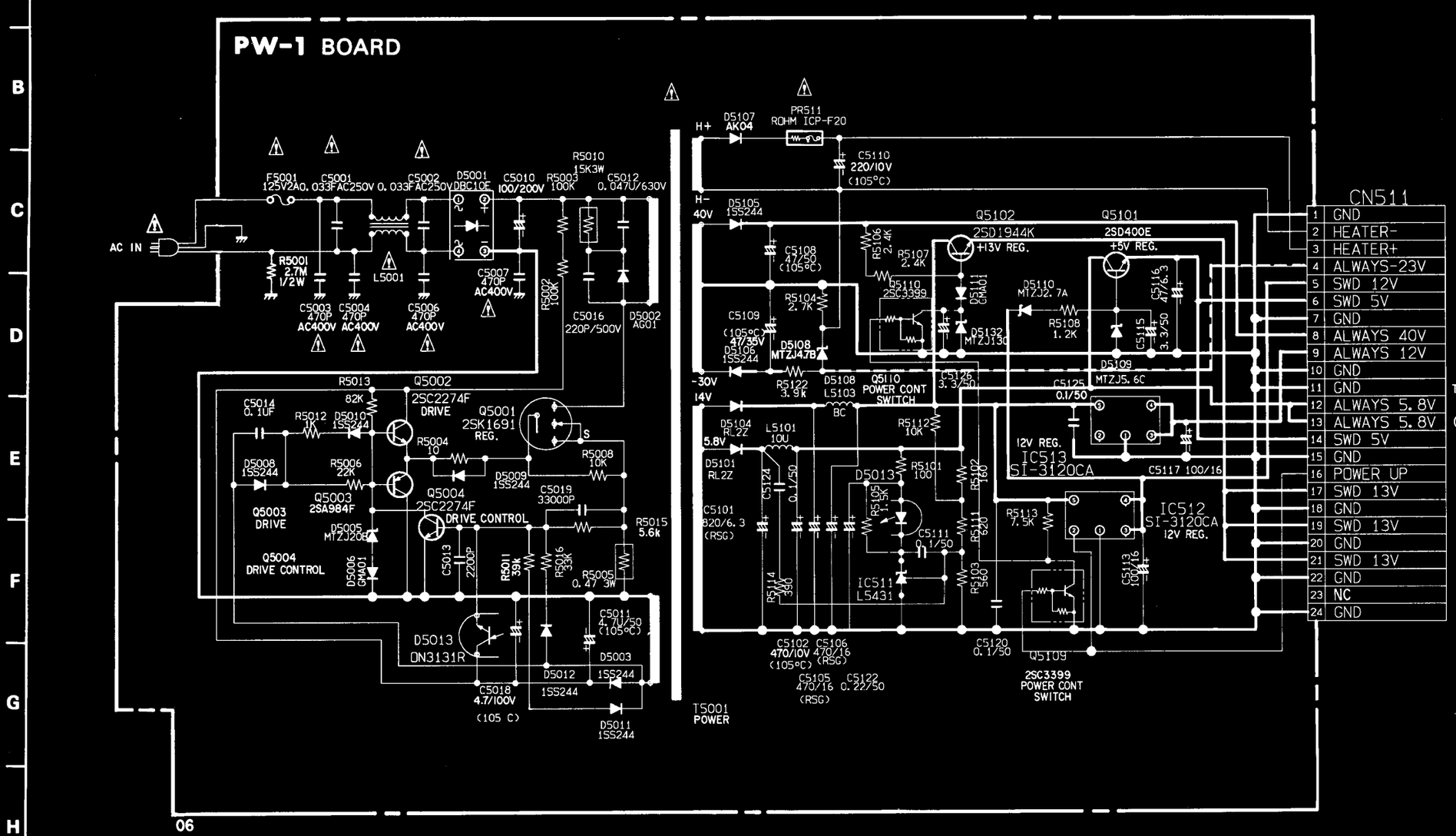
TM-1 BOARD KEY CONTROL CIRCUIT DIAGRAM



TM-2 BOARD MODE CONTROL CIRCUIT DIAGRAM



PW-1 BOARD POWER SUPPLY CIRCUIT DIAGRAM



Note:	Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

SECTION 5
EXPLODED VIEWS

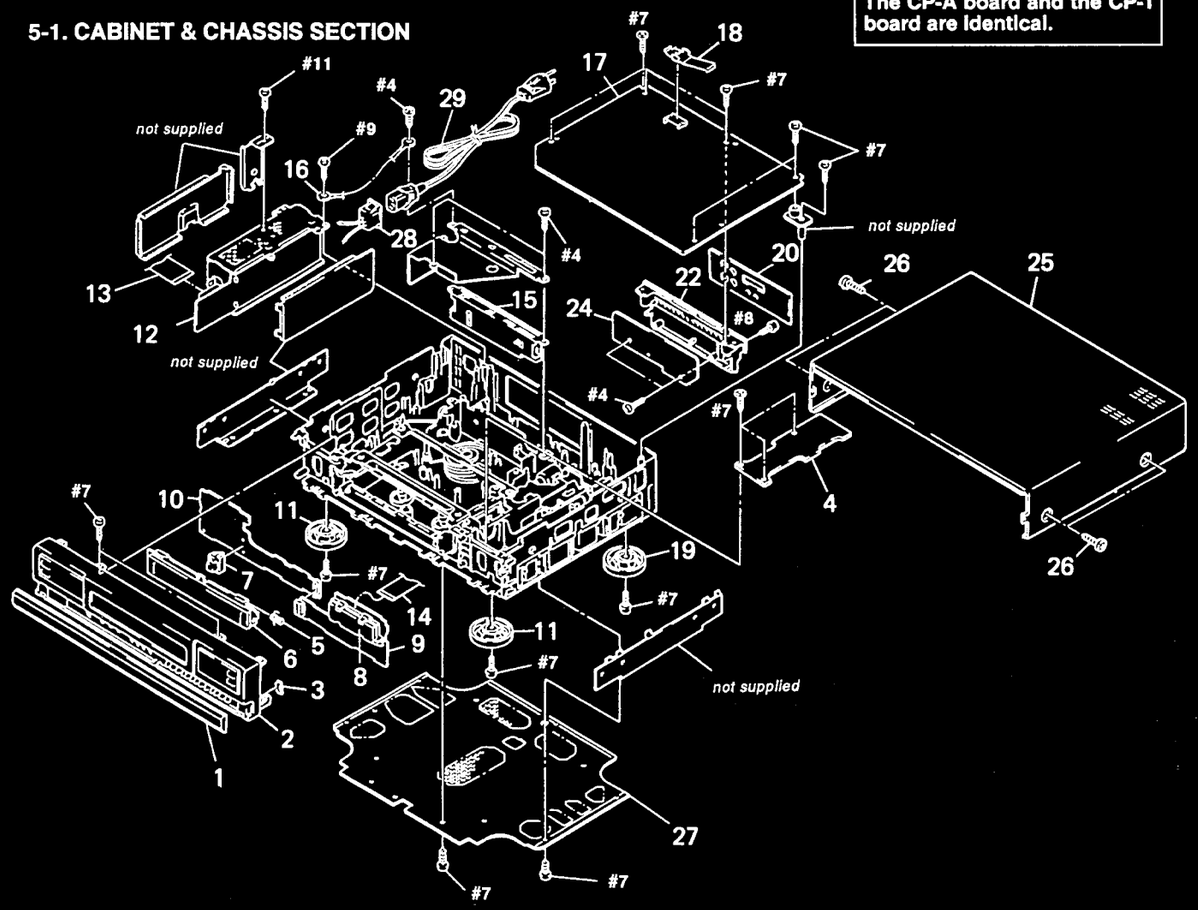
NOTE :
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked " * "are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

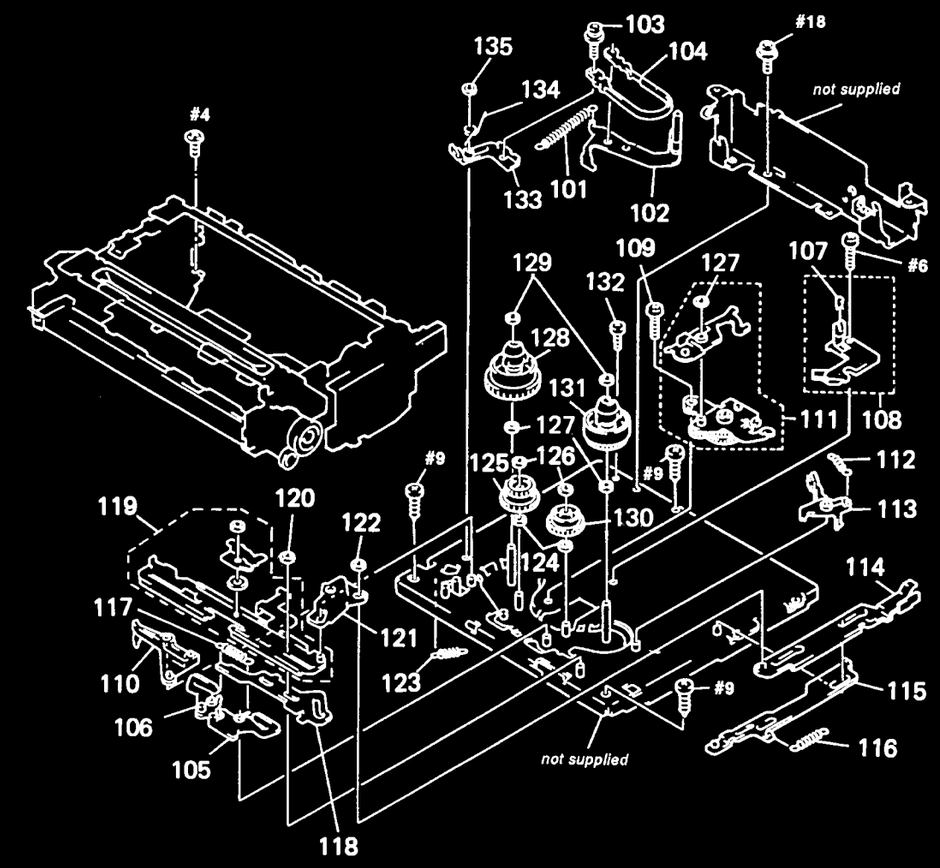
The CP-A board and the CP-1 board are identical.

5-1. CABINET & CHASSIS SECTION



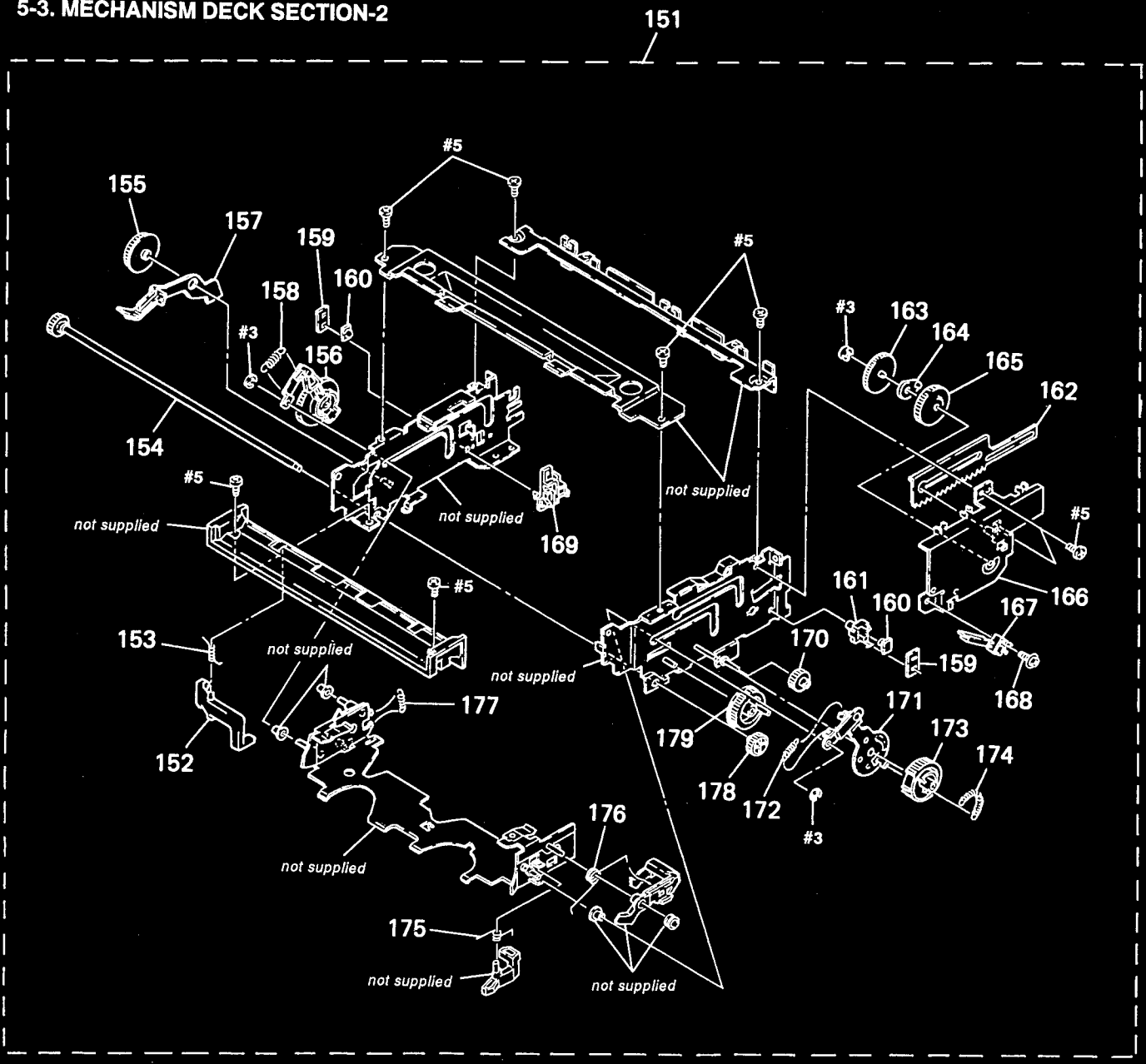
Ref.No.	Part No.	Description	Remark
1	A-6780-047-A	DOOR ASSY	
2	A-6780-046-A	CABINET ASSY, FRONT	
3	3-740-330-01	LOCK	
* 4	A-6794-016-A	CP-2 BOARD, COMPLETE	
5	3-735-605-01	SPRING	
6	3-946-565-01	DOOR, CASSETTE	
7	3-946-790-01	BUTTON (TIMER/AUDIO)	
8	3-946-546-01	INDICATOR	
* 9	A-6794-012-A	TM-1 BOARD, COMPLETE	
* 10	A-6794-013-A	TM-2 BOARD, COMPLETE	
11	3-946-553-01	STAND	
⚠*12	A-6756-365-A	PW-1 BOARD, COMPLETE	
13	1-769-187-11	CABLE, FLEXIBLE FLAT (24P)	
14	1-769-186-11	CABLE, FLEXIBLE FLAT (25P)	
* 15	A-6794-015-A	VP-1 BOARD, COMPLETE	
16	1-769-188-11	CORD, TERMINAL	
* 17	A-6794-006-A	CP-A BOARD, COMPLETE	
18	3-747-604-01	SPRING PLATE	
* 19	3-961-381-01	STAND (BACK)	
* 20	3-961-389-01	INDICATOR, DEC	
* 22	3-961-387-01	BRACKET, TERMINAL	
* 24	A-6794-014-A	TB-1 BOARD, COMPLETE	
25	3-946-564-01	COVER, TOP	
26	3-740-382-01	+BTS-B S 4X12	
27	3-946-561-01	COVER, BOTTOM	
⚠ 28	1-695-413-11	CONNECTOR, INLET	
⚠ 29	1-690-826-11	CORD, POWER (UL)	

5-2. MECHANISM DECK SECTION-1



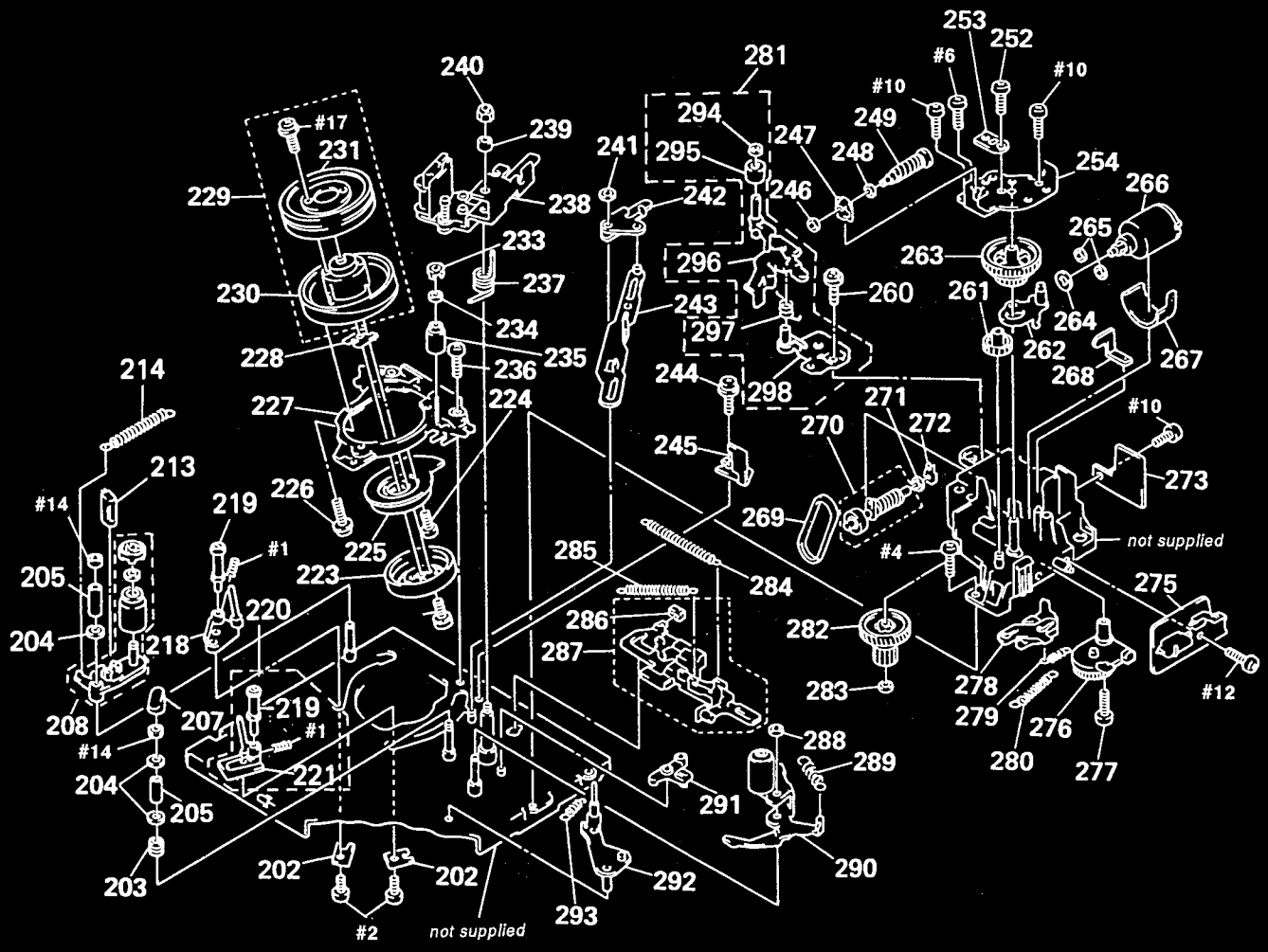
Ref.No.	Part No.	Description	Remark
101	3-946-532-01	SPRING, LEVER TENSION	
102	3-946-528-01	TENSION (ASSY), LEVER	
103	3-946-498-01	SCREW (2.6X2.4), SCR PAN +FLG	
104	3-946-520-01	HOLDER (ASSY), BAND	
105	3-946-515-01	BRAKE (ASSY), TAKE-UP	
106	3-735-656-01	BRAKE ASSY, S	
107	1-808-722-11	DIODE LN59	
* 108	A-6756-374-A	MC-4 BOARD, COMPLETE	
109	3-942-657-01	SCREW (2.6X4), SPECIAL	
110	3-735-655-01	BRAKE SUB, S	
111	A-6773-660-A	CLUTCH ASSY, IDLER	
112	3-735-665-01	SPRING	
113	3-735-664-01	BRAKE SUB ASSY, T	
114	3-946-523-01	PLATE (ASSY), ACT, SLIDE	
115	3-955-019-01	SLIDE, C BRAKE	
116	3-735-627-01	SPRING	
117	3-735-658-01	SPRING	
* 118	3-735-628-01	BRAKE, SLIDE ACT	
119	A-6773-695-A	PLATE ASSY, M, SLIDE	
120	3-735-761-01	WASHER (DIA.2.6)	
121	3-735-663-01	LEVER, CONTROL	
122	3-746-725-01	WASHER, SPECIAL	
123	3-740-348-01	SPRING	
124	3-735-750-01	WASHER (DIA.2.6), SPECIAL	
125	3-946-525-01	GEAR (ASSY), ONE-WAY	
126	3-741-401-01	WASHER Y 2.1X6X0.25	
127	3-946-501-01	WASHER (2.6X6X0.13)	
128	3-946-510-01	REEL (SUPPLY) (ASSY)	
129	3-735-755-01	WASHER (DIA.2.6)	
130	3-946-530-01	GEAR, REEL TAKE-UP	
131	3-946-509-01	REEL (TAKE-UP) (ASSY)	
132	3-746-714-01	SCREW (3X12), SPECIAL	
133	3-946-527-01	BAND (ASSY), LEVER BRAKE	
134	3-946-535-01	SPRING, LEVER BRAKE	
135	3-946-499-01	WASHER, SPECIAL	

5-3. MECHANISM DECK SECTION-2



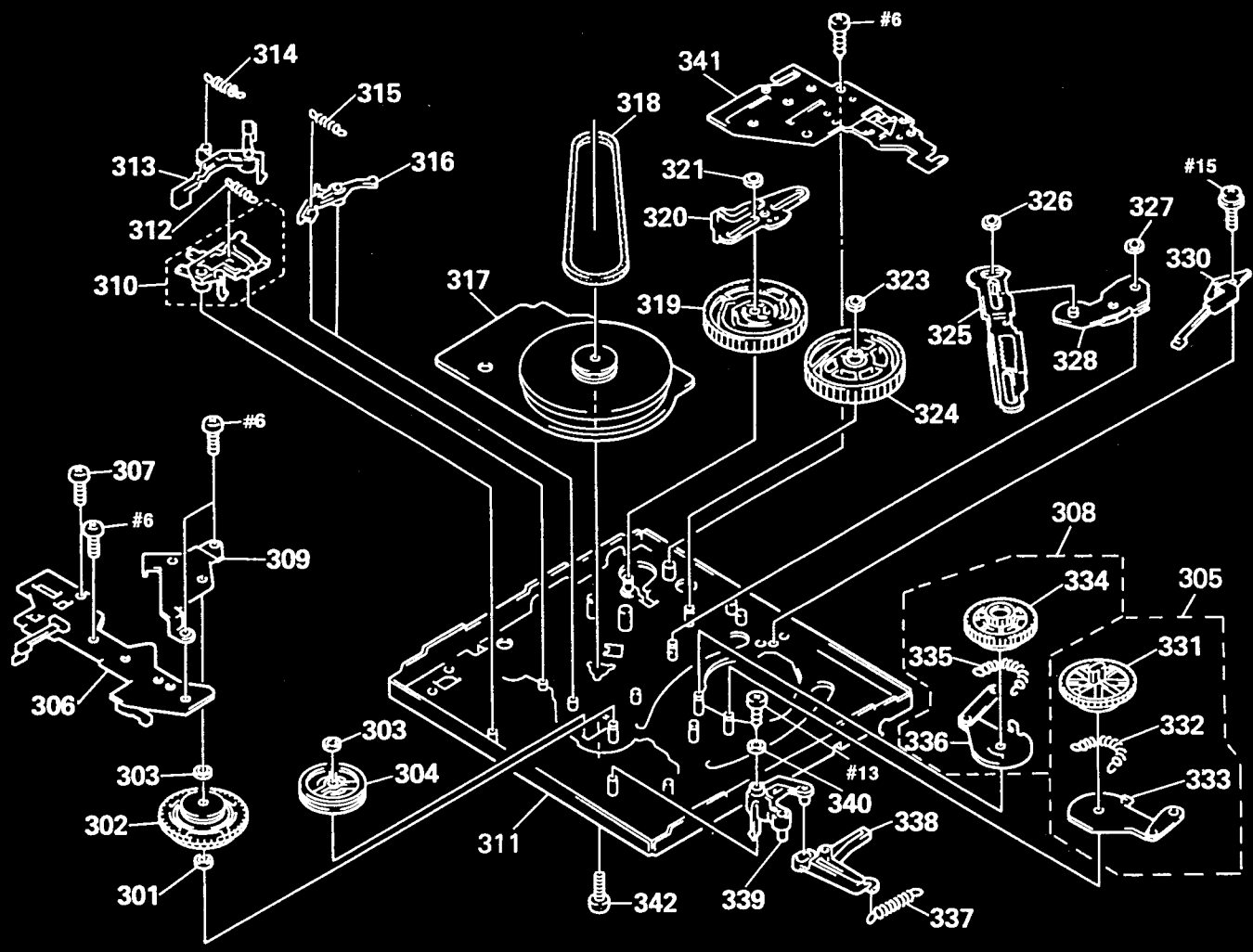
Ref. No.	Part No.	Description	Remark
151	A-6773-655-A	MECHANICAL ASSY, CASSETTE	
152	3-942-686-01	LEVER, SAFETY SWITCH	
153	3-942-688-01	SPRING, SAFETY SWITCH	
154	3-735-717-01	ROD ASSY	
155	3-735-722-01	GEAR, IDLER (LEFT)	
156	3-735-719-01	LEVER (L) ASSY, GEAR	
157	3-735-721-01	LEVER, DOOR OPENER	
158	3-735-720-01	SPRING	
159	3-735-734-01	LID	
160	1-808-710-11	PHOTO TRANSISTOR	
* 161	3-940-408-01	HOLDER, TRANSISTOR	
162	3-740-344-01	LOCK	
163	3-735-731-01	GEAR, LOCK	
164	3-735-732-01	LEVER ASSY, PINION	
165	3-735-730-01	GEAR, PINION	
166	3-740-342-01	BRACKET, GEAR	
167	3-740-345-01	BUTTON, SPECIAL SW	
168	3-735-775-01	SCREW (2X9), +PSW	
* 169	3-735-733-01	HOLDER, TR	
170	3-735-728-01	GEAR, IDLER	
171	3-735-723-01	GEAR ASSY, LEVER	
172	3-735-726-01	SPRING	
173	3-735-724-01	GEAR, MAIN	
174	3-735-725-01	SPRING	
175	3-940-411-01	SPRING, LOCK OFF	
176	3-940-410-01	SPRING, OPENER	
177	3-940-409-01	SPRING, TRAY LOCK	
178	3-735-718-01	GEAR (R)	
179	3-735-727-01	GEAR, IDLER (RIGHT)	

5-4. MECHANISM DECK SECTION-3



Ref. No.	Part No.	Description	Remark
202	3-735-631-01	PLATE, GUIDE	
203	3-735-677-01	SPRING	
204	3-741-408-01	WASHER, SPECIAL	
205	3-942-674-01	GUIDE, TAPE	
207	3-943-187-01	CAP	
208	A-6773-852-A	LEVER ASSY, FE HEAD	
213	3-735-687-01	HEAD, FTE	
214	3-735-686-01	SPRING	
218	3-946-544-01	ROLLER (S) (BASE) (ASSY)	
219	3-735-630-01	ROLLER ASSY, GUIDE	
220	3-746-731-01	ROLLER BASE (T) BOARD, COMPLETE	
221	3-735-632-01	ROLLER (T) ASSY, BASE	
* 223	1-461-017-11	ROTOR	
224	3-741-416-01	SCR PAN+SW+W 2.3X10	
225	1-462-284-11	STATOR	
226	3-740-370-01	SCREW (2.6X8), SPECIAL	
227	3-946-547-01	CYLINDER (BASE) (ASSY)	
228	3-735-738-01	SPACER, MOTOR	
229	A-6050-869-A	CYLINDER(2N4N-Q) BOARD, COMPLETE	
230	3-746-722-01	CYLINDER (LWR4)	
231	3-946-562-01	CYLINDER (UPR 2N4N-Q)	
233	3-946-513-01	BRACKET	
234	3-946-496-01	WASHER (Y) (1.6X3.2X0.25)	
235	3-946-514-01	ROLLER	
236	3-740-398-01	SCR PAN+FLG 3X6	
237	3-735-680-01	SPRING	
238	3-961-990-01	BRACKET	
239	3-749-106-01	SLEEVE, ACE HEAD	
240	3-735-682-01	NUT (M5), SPECIAL	
241	3-735-759-01	WASHER (DIA.3)	
* 242	3-735-673-01	PINCH LEVER ASSY	
243	3-960-459-01	SLIDE, ACT PINCH	
244	3-741-410-01	SCR PAN+SE+W 2.6X5	
245	3-942-071-01	STOPPER, BRACKET	
246	3-741-412-01	WASHER, SPECIAL	
247	3-735-696-01	HOLDER, WORM	
248	3-740-357-01	WASHER	
249	3-735-706-01	WORM ASSY, F	
252	3-740-355-01	SCREW (+P) (2.6X5)	
253	1-810-708-11	SENSOR, DEW (R-SPECIAL)	
254	3-942-065-01	BRACKET, HOLDER	
260	3-741-414-01	SCR PAN+SW+W 2.6X6	
261	3-735-704-01	GEAR	
262	3-740-366-01	LEVER, FRONT	
263	3-735-703-01	GEAR (F), HELICAL	
264	3-735-708-01	DAMPER, WORM	
265	3-740-365-01	DAMPER, MOTOR	
266	3-942-091-01	MOTOR ASSY, THREADING	
267	3-740-358-01	DAMPER, MOTOR	
268	3-740-354-01	PLATE, NUT	
269	3-735-709-01	BELT (LOADING)	
270	3-740-359-01	LOAD WORM	
271	3-735-774-01	WASHER (DIA.2)	
272	3-741-413-01	HOLDER WORM	
* 273	1-589-269-11	MOUNTED BOARD (MC-3)	
* 275	3-746-718-01	HOLDER, HARNESS	
276	1-572-383-11	SWITCH, ROTARY	
277	3-741-411-01	SCR PAN 2.6X13	
278	3-740-362-01	SLIDE, FRONT	
279	3-740-363-01	SPRING	
280	3-740-364-01	SPRING	
281	A-6779-256-A	BRACKET COMPLETE ASSY, CLEANER	
282	3-740-361-01	GEAR, HELICAL	
283	3-740-367-01	WASHER, SLIT	
284	3-735-669-01	SPRING	
285	3-946-534-01	SPRING, SLIDE BRAKE	
286	3-735-668-01	DAMPER	
287	A-6773-659-A	CAM ASSY, SLIDE	
288	3-735-757-01	WASHER (DIA.3.6)	
289	3-735-675-01	SPRING	
290	3-735-674-01	PINCH ROLLER, COMPL	
291	3-735-671-01	LEVER, ACT BRAKE	
292	3-749-023-01	GUIDE (REV), LEVER ASSY	
293	3-735-660-01	SPRING	
294	3-735-758-01	WASHER (DIA.2.6)	
295	3-960-267-01	ROLLER (ASSY), CLEANER	
296	3-954-694-01	CLEANER (ASSY), LEVER	
297	3-942-069-01	SPRING	
298	3-954-693-01	BRACKET, CLEANER	

5-5. MECHANISM DECK SECTION-4



Ref. No.	Part No.	Description	Remark
301	3-735-760-01	WASHER (DIA. 3), SPECIAL	
302	3-946-524-01	FRICTION (ASSY), GEAR	
303	3-948-603-01	WASHER, SPECIAL	
304	3-946-531-01	PULLEY, REEL	
305	A-6773-545-A	RING LOAD (S) BOARD, COMPLETE	
* 306	A-6756-375-A	MC-1 BOARD, COMPLETE	
307	3-740-396-01	SCR STPG BIN 2.6X5	
308	A-6773-546-A	RING LOAD (T) BOARD, COMPLETE	
309	3-946-529-01	PULLEY, BRACKET	
310	3-947-435-01	CLUTCH (ASSY), LEVER	
* 311	3-961-388-01	CHASSIS ASSY	
312	3-735-646-01	SPRING	
313	3-735-649-01	BRAKE ASSY, CAP	
314	3-741-405-01	CAPSTAN, SPRING	
315	3-735-648-01	SPRING	
316	3-735-647-01	LEVER, CONVERSION CLUTCH	
317	3-946-560-01	CAPSTAN (MOTOR)	
318	3-946-511-01	BELT, REEL DRIVE	
319	3-946-519-01	CAM, MODE	
320	3-955-018-01	SLIDE, CAM PLATE	

Ref. No.	Part No.	Description	Remark
321	3-735-759-01	WASHER (DIA. 3)	
323	3-735-756-01	WASHER (DIA. 3)	
324	3-946-559-01	CAM, MAIN	
325	3-735-642-01	RACK, LOAD	
326	3-735-758-01	WASHER (DIA. 2.6)	
327	3-735-757-01	WASHER (DIA. 3.6)	
328	3-735-641-01	LEVER ASSY, LOAD CAM	
330	3-735-693-01	PLATE ASSY, GROUND	
331	3-746-724-01	ROAD (S), GEAR	
332	3-735-634-01	SPRING	
333	3-735-633-01	LOAD (S) ASSY, LEVER	
334	3-749-022-01	LOAD, GEAR T	
335	3-735-637-01	SPRING (T)	
336	3-735-636-01	LOAD (T) ASSY, LEVER	
337	3-946-533-01	SPRING, REVERSE TENSION	
338	3-946-518-01	LEVER, RETURN TENSION	
339	3-740-368-01	CONTROL ASSY, LEVER	
340	3-735-765-01	WASHER (DIA. 2.6)	
* 341	3-735-692-01	BRACKET	
342	3-740-355-01	SCREW (+P) (2.6X5)	

SECTION 6
ELECTRICAL PARTS LIST

CP-2 CP-A

NOTE :
- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms
  METAL : Metal-film resistor
  METAL OXIDE : Metal oxide-film resistor
  F : nonflammable
- Items marked " * "are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u : μ , for example :
  uA.... : μA.... , uPA.... : μPA....
  uPB.... : μPB.... , uPC.... : μPC....
  uPD.... : μPD....
- CAPACITORS
  uF : μF
- COILS
  uH : μH

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

When indicating parts by reference number, please include the board.

The CP-A board and the CP-1 board are identical.

Ref.No.	Part No.	Description			Remark
*	A-6794-016-A	CP-2 BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C3801	1-126-154-11	ELECT	47uF	20%	6.3V
C3802	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3803	1-130-487-00	MYLAR	0.022uF	5%	50V
C7401	1-126-154-11	ELECT	47uF	20%	6.3V
C7402	1-161-063-00	CERAMIC	0.1uF	10%	50V
C7403	1-161-063-00	CERAMIC	0.1uF	10%	50V
C7404	1-136-165-00	FILM	0.1uF	5%	50V
C7405	1-130-483-00	MYLAR	0.01uF	5%	50V
C7406	1-130-483-00	MYLAR	0.01uF	5%	50V
C7407	1-161-063-00	CERAMIC	0.1uF	10%	50V
C7408	1-124-667-11	ELECT	10uF	20%	100V
C7409	1-124-667-11	ELECT	10uF	20%	100V
		< DIODE >			
D3801	8-719-901-33	DIODE	1SS133		
D7401	8-719-300-45	DIODE	EM-1Z		
D7402	8-719-901-33	DIODE	1SS133		
D7403	8-719-901-33	DIODE	1SS133		
D7404	8-719-901-33	DIODE	1SS133		
D7405	8-719-901-33	DIODE	1SS133		
D7406	8-719-901-33	DIODE	1SS133		
D7407	8-719-901-33	DIODE	1SS133		
D7408	8-719-901-33	DIODE	1SS133		
D7409	8-719-901-33	DIODE	1SS133		
D7410	8-719-901-33	DIODE	1SS133		
D7411	8-719-901-33	DIODE	1SS133		
D7412	8-719-300-45	DIODE	EM-1Z		
D7413	8-719-901-33	DIODE	1SS133		
D7414	8-719-901-33	DIODE	1SS133		
D7415	8-719-901-33	DIODE	1SS133		
D7416	8-719-901-33	DIODE	1SS133		
		< IC >			
IC381	1-809-588-11	IC	MLC4520B (CAP FG, CTL R/P CONTROL)		
IC741	8-759-240-81	IC	TC4081BP (REC GATE)		
IC742	1-806-749-11	IC	BA226 (CLOCK OSC)		
IC743	1-806-749-11	IC	BA226 (CLOCK OSC)		
		< TRANSISTOR >			
Q7401	8-729-900-89	TRANSISTOR	DTC144ES		
Q7402	8-729-900-89	TRANSISTOR	DTC144ES		
Q7403	8-729-900-89	TRANSISTOR	DTC144ES		
Q7404	8-729-900-89	TRANSISTOR	DTC144ES		
Q7405	8-729-900-89	TRANSISTOR	DTC144ES		
Q7406	8-729-900-89	TRANSISTOR	DTC144ES		
Q7407	8-729-900-89	TRANSISTOR	DTC144ES		
Q7408	8-729-900-65	TRANSISTOR	DTA144ES		
Q7409	8-729-900-89	TRANSISTOR	DTC144ES		
Q7410	8-729-900-89	TRANSISTOR	DTC144ES		
Q7411	8-729-900-89	TRANSISTOR	DTC144ES		
Q7412	8-729-900-89	TRANSISTOR	DTC144ES		
**********					
*	A-6794-006-A	CP-A BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C1002	1-162-289-31	CERAMIC	390PF	10%	50V
C1003	1-101-880-00	CERAMIC	47PF	5%	50V
C1004	1-126-529-11	ELECT	0.47uF	20%	50V
C1005	1-162-207-31	CERAMIC	22PF	5%	50V
C1007	1-164-077-11	CERAMIC	220PF	10%	50V
C1008	1-124-767-00	ELECT	2.2uF	20%	50V
C1009	1-161-494-00	CERAMIC	0.022uF		25V
C1010	1-124-257-00	ELECT	2.2uF	20%	50V
C1011	1-124-465-00	ELECT	0.47uF	20%	50V
C1012	1-164-072-11	CERAMIC	120PF	5%	50V

CP-A

Ref. No.	Part No.	Description			Remark
C1013	1-164-073-11	CERAMIC	100PF	10%	50V
C1014	1-130-493-00	MYLAR	0.068uF	5%	50V
C1015	1-161-494-00	CERAMIC	0.022uF		25V
C1016	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1017	1-161-494-00	CERAMIC	0.022uF		25V
C1018	1-126-176-11	ELECT	220uF	20%	10V
C1019	1-124-257-00	ELECT	2.2uF	20%	50V
C1020	1-124-667-11	ELECT	10uF	20%	100V
C1021	1-124-257-00	ELECT	2.2uF	20%	50V
C1022	1-126-154-11	ELECT	47uF	20%	6.3V
C1023	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1024	1-124-228-11	ELECT	22uF	20%	10V
C1025	1-124-465-00	ELECT	0.47uF	20%	50V
C1026	1-126-301-11	ELECT	1uF	20%	50V
C1027	1-126-301-11	ELECT	1uF	20%	50V
C1028	1-124-234-00	ELECT	22uF	20%	16V
C1029	1-162-205-31	CERAMIC	18PF		50V
C1031	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1032	1-124-589-11	ELECT	47uF	20%	16V
C1033	1-126-301-11	ELECT	1uF	20%	50V
C1034	1-162-212-31	CERAMIC	36PF	5%	50V
C1036	1-164-073-11	CERAMIC	100PF	10%	50V
C1037	1-126-163-11	ELECT	4.7uF	20%	50V
C1038	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1039	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1040	1-162-290-31	CERAMIC	470PF	10%	50V
C1041	1-126-154-11	ELECT	47uF	20%	6.3V
C1043	1-161-063-00	CERAMIC	0.1uF	10%	50V
C1101	1-161-053-00	CERAMIC	0.015uF	10%	50V
C1102	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1103	1-126-301-11	ELECT	1uF	20%	50V
C1104	1-162-292-31	CERAMIC	680PF	10%	50V
C1105	1-124-257-00	ELECT	2.2uF	20%	50V
C1106	1-126-301-11	ELECT	1uF	20%	50V
C1107	1-161-494-00	CERAMIC	0.022uF		25V
C1108	1-161-021-11	CERAMIC	0.047uF	10%	25V
C1109	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1110	1-161-494-00	CERAMIC	0.022uF		25V
C1111	1-161-063-00	CERAMIC	0.1uF	10%	50V
C1112	1-126-301-11	ELECT	1uF	20%	50V
C1113	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1114	1-162-214-31	CERAMIC	43PF	5%	50V
C1115	1-162-211-31	CERAMIC	33PF	5%	50V
C1116	1-161-063-00	CERAMIC	0.1uF	10%	50V
C1117	1-126-154-11	ELECT	47uF	20%	6.3V
C1118	1-164-073-11	CERAMIC	100PF	10%	50V
C1119	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1121	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1128	1-164-072-11	CERAMIC	120PF	5%	50V
C1130	1-162-207-31	CERAMIC	22PF	5%	50V
C1132	1-161-494-00	CERAMIC	0.022uF		25V
C1351	1-101-880-00	CERAMIC	47PF	5%	50V
C1352	1-162-212-31	CERAMIC	36PF	5%	50V
C1401	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1402	1-161-063-00	CERAMIC	0.1uF	10%	50V
C1403	1-124-228-11	ELECT	22uF	20%	10V
C1404	1-126-301-11	ELECT	1uF	20%	50V
C1405	1-164-073-11	CERAMIC	100PF	10%	50V
C1406	1-130-475-00	POLYESTE	2200PF		50V
C1407	1-161-494-00	CERAMIC	0.022uF		25V
C1408	1-126-154-11	ELECT	47uF	20%	6.3V
C1409	1-164-073-11	CERAMIC	100PF	10%	50V
C1501	1-161-063-00	CERAMIC	0.1uF	10%	50V
C1502	1-126-155-11	ELECT	100uF	20%	6.3V
C1504	1-126-162-11	ELECT	3.3uF	20%	50V
C1505	1-162-212-31	CERAMIC	36PF	5%	50V
C1506	1-164-060-11	CERAMIC	39PF	5%	50V
C1507	1-164-073-11	CERAMIC	100PF	10%	50V
C1508	1-164-073-11	CERAMIC	100PF	10%	50V
C1509	1-164-073-11	CERAMIC	100PF	10%	50V
C1510	1-126-155-11	ELECT	100uF	20%	6.3V
C1511	1-161-063-00	CERAMIC	0.1uF	10%	50V
C1513	1-126-301-11	ELECT	1uF	20%	50V
C1518	1-124-259-11	ELECT	4.7uF	20%	50V
C1519	1-124-767-00	ELECT	2.2uF	20%	50V
C1520	1-161-063-00	CERAMIC	0.1uF	10%	50V
C1521	1-124-589-11	ELECT	47uF	20%	16V
C1522	1-161-063-00	CERAMIC	0.1uF	10%	50V
C1523	1-161-063-00	CERAMIC	0.1uF	10%	50V
C1551	1-161-063-00	CERAMIC	0.1uF	10%	50V
C1552	1-126-155-11	ELECT	100uF	20%	6.3V
C1553	1-126-301-11	ELECT	1uF	20%	50V
C1554	1-164-073-11	CERAMIC	100PF	10%	50V
C1555	1-164-077-11	CERAMIC	220PF	10%	50V
C1556	1-162-209-31	CERAMIC	27PF	5%	50V
C1605	1-126-168-11	ELECT	1000uF	20%	6.3V
C1609	1-126-301-11	ELECT	1uF	20%	50V
C2001	1-161-494-00	CERAMIC	0.022uF		25V
C2004	1-161-040-00	CERAMIC	0.0012uF	10%	25V
C2005	1-124-937-11	ELECT	10uF	20%	16V
C2006	1-104-792-51	ELECT	33uF	20%	16V
C2007	1-161-379-00	CERAMIC	0.01uF	20%	25V
C2008	1-124-252-00	ELECT	0.33uF	20%	50V
C2009	1-124-228-11	ELECT	22uF	20%	10V
C2010	1-162-600-11	CERAMIC	0.0047uF	20%	16V
C2011	1-124-667-11	ELECT	10uF	20%	100V
C2012	1-124-589-11	ELECT	47uF	20%	16V
C2013	1-126-163-11	ELECT	4.7uF	20%	50V
C2014	1-161-379-00	CERAMIC	0.01uF	20%	25V
C2017	1-126-163-11	ELECT	4.7uF	20%	50V

When indicating parts by reference number, please include the board.

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Ref.No.	Part No.	Description			Remark
C2018	1-161-379-00	CERAMIC	0.01uF	20%	25V
C2019	1-124-831-11	ELECT	4.7uF	20%	25V
C2021	1-161-379-00	CERAMIC	0.01uF	20%	25V
C2022	1-161-379-00	CERAMIC	0.01uF	20%	25V
C2023	1-162-286-31	CERAMIC	220PF	10%	50V
C2024	1-110-363-11	CAP, POLYP	6800PF		100V
C2025	1-124-257-00	ELECT	2.2uF	20%	50V
C2029	1-126-969-11	ELECT	220uF	20%	25V
C2030	1-104-792-51	ELECT	33uF	20%	16V
C2031	1-104-792-51	ELECT	33uF	20%	16V
C2033	1-124-465-00	ELECT	0.47uF	20%	50V
C2034	1-136-165-00	FILM	0.1uF	5%	50V
C2035	1-161-040-00	CERAMIC	0.0012uF	10%	25V
C2036	1-161-327-00	CERAMIC	0.0033uF	30%	50V
C3001	1-124-443-00	ELECT	100uF	20%	10V
C3002	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3003	1-162-294-31	CERAMIC	0.001uF	10%	50V
C3004	1-124-463-00	ELECT	0.1uF	20%	50V
C3005	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3006	1-162-286-31	CERAMIC	220PF	10%	50V
C3008	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3009	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3010	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3011	1-162-294-31	CERAMIC	0.001uF	10%	50V
C3012	1-124-443-00	ELECT	100uF	20%	10V
C3014	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3015	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3501	1-130-491-00	MYLAR	0.047uF	5%	50V
C3502	1-136-165-00	FILM	0.1uF	5%	50V
C3503	1-136-165-00	FILM	0.1uF	5%	50V
C3504	1-130-490-11	MYLAR	0.039uF	5%	50V
C3505	1-130-489-11	MYLAR	0.033uF	5%	50V
C3506	1-161-494-00	CERAMIC	0.022uF		25V
C3507	1-130-487-00	MYLAR	0.022uF	5%	50V
C3508	1-130-481-00	MYLAR	0.0068uF	5%	50V
C3510	1-136-169-00	FILM	0.22uF	5%	50V
C3512	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3513	1-161-374-11	CERAMIC	0.0015uF	20%	50V
C3514	1-161-375-00	CERAMIC	0.0022uF	20%	50V
C3515	1-161-053-00	CERAMIC	0.015uF	10%	50V
C3516	1-161-329-00	CERAMIC	0.0068uF	30%	25V
C3517	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3518	1-124-234-00	ELECT	22uF	20%	16V
C3519	1-124-234-00	ELECT	22uF	20%	16V
C3520	1-124-234-00	ELECT	22uF	20%	16V
C3521	1-124-234-00	ELECT	22uF	20%	16V
C3522	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3523	1-162-294-31	CERAMIC	0.001uF	10%	50V
C3524	1-130-487-00	MYLAR	0.022uF	5%	50V
C3525	1-130-479-00	MYLAR	0.0047uF	5%	50V
C3526	1-130-479-00	MYLAR	0.0047uF	5%	50V
C3527	1-162-286-31	CERAMIC	220PF	10%	50V
C3528	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3529	1-124-443-00	ELECT	100uF	20%	10V
C3530	1-124-443-00	ELECT	100uF	20%	10V
C3531	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3532	1-130-483-00	MYLAR	0.01uF	5%	50V
C3533	1-136-169-00	FILM	0.22uF	5%	50V
C3534	1-162-286-31	CERAMIC	220PF	10%	50V
C3535	1-130-484-00	MYLAR	0.012uF	5%	50V
C3536	1-104-792-51	ELECT	33uF	20%	16V
C3537	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3538	1-161-061-11	CERAMIC	0.068uF	10%	50V
C3539	1-136-165-00	FILM	0.1uF	5%	50V
C3540	1-130-481-00	MYLAR	0.0068uF	5%	50V
C3541	1-124-443-00	ELECT	100uF	20%	10V
C3542	1-136-165-00	FILM	0.1uF	5%	50V
C3543	1-124-499-11	ELECT, NONPOLAR	1uF	20%	50V
C3544	1-124-499-11	ELECT, NONPOLAR	1uF	20%	50V
C3545	1-124-499-11	ELECT, NONPOLAR	1uF	20%	50V
C3546	1-124-499-11	ELECT, NONPOLAR	1uF	20%	50V
C3547	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3548	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3549	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3550	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3551	1-124-667-11	ELECT	10uF	20%	100V
C3552	1-124-286-00	ELECT	33uF	20%	16V
C3553	1-124-667-11	ELECT	10uF	20%	100V
C3554	1-162-292-31	CERAMIC	680PF	10%	50V
C3556	1-162-294-31	CERAMIC	0.001uF	10%	50V
C3557	1-162-294-31	CERAMIC	0.001uF	10%	50V
C3558	1-130-489-11	MYLAR	0.033uF	5%	50V
C3559	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3560	1-126-155-11	ELECT	100uF	20%	6.3V
C3561	1-162-211-31	CERAMIC	33PF	5%	50V
C3562	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3563	1-124-667-11	ELECT	10uF	20%	100V
C3566	1-164-073-11	CERAMIC	100PF	10%	50V
C3570	1-162-294-31	CERAMIC	0.001uF	10%	50V
C3571	1-130-728-00	FILM	0.0022uF	5%	50V
C3572	1-161-379-00	CERAMIC	0.01uF	20%	25V
C7301	1-124-472-11	ELECT	470uF	20%	10V
C7302	1-162-294-31	CERAMIC	0.001uF	10%	50V

< DIODE >

D1002	8-719-912-20	DIODE	1SS120
D1031	8-719-110-13	DIODE	RD9.1ES-B2
D1103	8-719-901-33	DIODE	1SS133
D1401	8-719-912-20	DIODE	1SS120
D1402	8-719-912-20	DIODE	1SS120

When indicating parts by reference number, please include the board.

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Ref.No.	Part No.	Description	Remark
D1403	8-719-912-20	DIODE 1SS120	
D1405	8-719-912-20	DIODE 1SS120	
D1501	8-719-912-20	DIODE 1SS120	
D1502	8-719-912-20	DIODE 1SS120	
D3001	8-719-300-45	DIODE EM-1Z	
D3005	8-719-109-89	DIODE RD5.6ES-B2	
D3006	8-719-110-08	DIODE RD8.2ES-B2	
D3007	8-719-901-33	DIODE 1SS133	
D3008	8-719-901-33	DIODE 1SS133	
D3009	8-719-901-33	DIODE 1SS133	
D3010	8-719-901-33	DIODE 1SS133	
D3501	8-719-901-33	DIODE 1SS133	
D3502	8-719-901-33	DIODE 1SS133	
D3503	8-719-901-33	DIODE 1SS133	
D3504	8-719-901-33	DIODE 1SS133	
D3514	8-719-901-33	DIODE 1SS133	
D3515	8-719-901-33	DIODE 1SS133	
D3517	8-719-901-33	DIODE 1SS133	
D3519	8-719-901-33	DIODE 1SS133	
D3520	8-719-901-33	DIODE 1SS133	
D3521	8-719-901-33	DIODE 1SS133	
D3522	8-719-901-33	DIODE 1SS133	
D3523	8-719-901-33	DIODE 1SS133	
D3524	8-719-901-33	DIODE 1SS133	
D3525	8-719-901-33	DIODE 1SS133	
D3526	8-719-901-33	DIODE 1SS133	
D3527	8-719-901-33	DIODE 1SS133	
D3528	8-719-901-33	DIODE 1SS133	
D3531	8-719-901-33	DIODE 1SS133	
D3533	8-719-901-33	DIODE 1SS133	
D3534	8-719-901-33	DIODE 1SS133	
D7301	8-719-901-83	DIODE 1SS83	
D7302	8-719-300-45	DIODE EM-1Z	
D7305	8-719-901-33	DIODE 1SS133	
D7306	8-719-901-33	DIODE 1SS133	
D7307	8-719-901-33	DIODE 1SS133	
D7308	8-719-901-33	DIODE 1SS133	
D7309	8-719-901-33	DIODE 1SS133	
D7310	8-719-901-33	DIODE 1SS133	
		< DELAY LINE >	
DL131	1-415-863-11	DELAY LINE	
		< IC >	
IC101	8-759-821-84	IC LA7340S (Y SIGNAL PROCESS)	
IC102	8-759-821-50	IC LC8991 (1H CDD)	
IC103	8-759-927-56	IC BA7021 (SEL)	
IC111	8-759-822-29	IC LA7332 (CHROMA SIGNAL PROCESS)	
IC112	1-809-584-11	IC LA6393D (ACK)	
IC141	1-809-587-11	IC MLC4081B (QV GENERATOR)	
IC142	8-759-514-54	IC BA7046	
IC151	1-809-589-11	IC M50556-001SP (CHARACTOR GENERATOR)	
IC152	8-759-822-05	IC LA7213 (H/V SYNC SEPARATOR)	
IC201	1-808-886-11	IC LA7294 (NORMAL AUDIO REC/PB AMP)	
IC301	1-810-849-11	IC LC66P516-P4E61 (SYSTEM CONTROL)	
IC302	8-759-634-97	IC M51953AL (INITIAL RESET)	
IC303	8-759-822-09	IC LB1641 (LOADING MOTOR DRIVE)	
IC304	1-809-584-11	IC LA6393D (DEW DETECT, T REEL FG AMP)	
IC351	1-809-772-11	IC LC7418-8553 (DRUM/CAPSTAN SERVO)	
IC352	1-809-586-11	IC LC9108B-385 (SLOW CONTROL)	
IC353	1-809-033-11	IC LA7124 (SERVO AMP, CTL AMP)	
IC354	8-759-932-48	IC BU4538B (CTL R/P SW)	
IC356	8-759-300-71	IC HD14053BFP (CTL R/P SW)	
IC357	1-809-994-11	IC LC4013B (CAP FG 1/2f)	
IC358	8-759-932-40	IC BU4030B (INVERTER/MULTIPLY)	
IC359	8-759-300-71	IC HD14053BFP (FG SW)	
IC731	1-809-995-11	IC LC4069UB (INVERTER)	
		< COIL >	
L1001	1-410-335-11	INDUCTOR 150uH	
L1031	1-410-522-11	INDUCTOR 120uH	
L1032	1-410-316-11	INDUCTOR 1uH	
L1101	1-410-512-11	INDUCTOR 18uH	
L1102	1-410-509-11	INDUCTOR 10uH	
L1104	1-410-517-11	INDUCTOR 47uH	
L1501	1-410-511-11	INDUCTOR 15uH	
L1502	1-410-521-11	INDUCTOR 100uH	
L1503	1-410-521-11	INDUCTOR 100uH	
L1504	1-410-521-11	INDUCTOR 100uH	
L2001	1-414-091-11	CHOKE, HF 6800uH	
L2002	1-412-819-11	HF CHOKE 560uH	
L2003	1-412-819-11	HF CHOKE 560uH	
L2004	1-402-871-11	HF CHOKE 27MH	
		< TRANSISTOR >	
Q1002	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1003	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1004	8-729-900-89	TRANSISTOR DTC144ES	
Q1031	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1032	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1101	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1102	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1103	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1104	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1105	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1151	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1401	8-729-140-97	TRANSISTOR 2SB734-34	
Q1402	8-729-140-97	TRANSISTOR 2SB734-34	
Q1403	8-729-900-89	TRANSISTOR DTC144ES	

When indicating parts by reference number, please include the board.

Ref.No.	Part No.	Description			Remark
Q1404	8-729-900-89	TRANSISTOR	DTC144ES		
Q1405	8-729-900-89	TRANSISTOR	DTC144ES		
Q1406	8-729-900-89	TRANSISTOR	DTC144ES		
Q1407	8-729-345-85	TRANSISTOR	2SC458K		
Q1501	8-729-140-97	TRANSISTOR	2SB734-34		
Q1502	8-729-119-78	TRANSISTOR	2SC2785-HFE		
Q1503	8-729-119-78	TRANSISTOR	2SC2785-HFE		
Q1601	8-729-119-76	TRANSISTOR	2SA1175-HFE		
Q2001	8-729-281-53	TRANSISTOR	2SC1815-GR		
Q3003	8-729-900-89	TRANSISTOR	DTC144ES		
Q3501	8-729-900-89	TRANSISTOR	DTC144ES		
Q3502	8-729-900-65	TRANSISTOR	DTA144ES		
Q3503	8-729-900-65	TRANSISTOR	DTA144ES		
Q3504	8-729-900-89	TRANSISTOR	DTC144ES		
Q3505	8-729-900-89	TRANSISTOR	DTC144ES		
Q3506	8-729-119-78	TRANSISTOR	2SC2785-HFE		
Q3507	8-729-119-78	TRANSISTOR	2SC2785-HFE		
Q3508	8-729-900-89	TRANSISTOR	DTC144ES		
Q3509	8-729-119-78	TRANSISTOR	2SC2785-HFE		
Q3510	8-729-119-76	TRANSISTOR	2SA1175-HFE		
Q3511	8-729-900-89	TRANSISTOR	DTC144ES		
Q3512	8-729-900-89	TRANSISTOR	DTC144ES		
Q3513	8-729-900-89	TRANSISTOR	DTC144ES		
Q3514	8-729-900-89	TRANSISTOR	DTC144ES		
Q3520	8-729-900-65	TRANSISTOR	DTA144ES		
Q3521	8-729-900-65	TRANSISTOR	DTA144ES		
Q3522	8-729-900-89	TRANSISTOR	DTC144ES		
Q7302	8-729-900-89	TRANSISTOR	DTC144ES		
Q7303	8-729-900-89	TRANSISTOR	DTC144ES		
		< RESISTOR >			
R1417	1-214-780-00	METAL	130K	1%	1/4W
R3001	1-212-946-11	FUSIBLE	3.3	5%	1/2W F
R7320	1-214-729-00	METAL	1.0K	1%	1/4W
R7321	1-214-719-00	METAL	390	1%	1/4W
		< SWITCH >			
S3501	1-762-202-11	SWITCH, DIP (1P-1TX2)			
		< TRANSFORMER >			
T2001	1-433-370-11	TRANSFORMER, OSC			
		< THERMISTOR >			
TH101	1-809-330-11	THERMISTOR TD5-C310DB			
		< VARIABLE RESISTOR >			
VR101	1-228-992-11	RES, ADJ, METAL GLAZE 3.3K (PB)			
VR102	1-228-994-00	RES, ADJ, METAL 10K (EE)			
VR103	1-228-995-00	RES, ADJ, METAL 22K (CAP)			
VR104	1-241-857-11	VR SEMI 15KB (DEV)			
VR105	1-228-990-00	RES, ADJ, METAL 1K (N.C.)			
VR201	1-228-997-00	RES, ADJ, METAL 100K (BIAS)			
VR202	1-237-518-21	RES, ADJ 10K (PB)			
VR203	1-228-989-00	RES, ADJ, METAL 470 (24H)			
VR204	1-228-991-00	RES, ADJ, METAL 2.2K (12H)			
VR353	1-228-998-00	RES, ADJ, METAL 220K (NOR-TR)			
VR354	1-228-997-00	RES, ADJ, METAL 100K (SW)			
		< CRYSTAL >			
X1101	1-579-957-11	CRYSTAL 3.579545MHZ			
		< FILTER >			
XF101	1-239-357-11	FILTER (Y3MLPF)			
XF102	1-239-258-11	FILTER 4MHz L.P			
XF111	1-579-043-11	FILTER			
XF301	1-577-682-11	RESONATOR, CERAMIC			
		< BATTERY, CHARGE >			
Z7301	1-528-566-11	BATTERY, CHARGE			
**********					
*	A-6756-375-A	MC-1 BOARD, COMPLETE			
		**********			
	1-571-932-11	SWITCH, LEAF			
	1-808-723-11	PHOTO COUPLER SPI-315-04-C			
	3-735-744-01	SPACER, PHOTO SENSOR			
**********					
*	A-6756-374-A	MC-4 BOARD, COMPLETE			
		**********			
	1-808-722-11	DIODE LN59			
**********					
⚠*	A-6756-365-A	PW-1 BOARD, COMPLETE			
		**********			
⚠	1-695-413-11	CONNECTOR, INLET			
	7-685-645-79	SCREW +BTP 3×6 TYPE2 N-S			
	7-682-561-04	SCREW +P 4×8			
	7-684-024-04	N 4, TYPE 2			
	7-688-004-01	W 4, SMALL			
		< CAPACITOR >			
⚠C5001	1-137-547-11	MT-POLYEST	0.033uF		250V
⚠C5002	1-137-547-11	MT-POLYEST	0.033uF		250V
⚠C5003	1-161-740-00	CERAMIC	470PF	10%	400V
⚠C5004	1-161-740-00	CERAMIC	470PF	10%	400V
⚠C5006	1-161-740-00	CERAMIC	470PF	10%	400V
⚠C5007	1-161-740-00	CERAMIC	470PF	10%	400V
C5010	1-124-810-11	ELECT	100uF	20%	200V

When indicating parts by reference number, please include the board.

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Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

PW-1 TB-1

Ref. No.	Part No.	Description			Remark
C5011	1-124-259-11	ELECT	4.7uF	20%	50V
C5012	1-137-542-11	MT-POLYEST	0.047uF		630V
C5013	1-130-728-00	FILM	0.0022uF	5%	50V
C5014	1-130-495-00	MYLAR	0.1uF	5%	50V
C5016	1-165-171-11	CAP, CERAMIC	220PF		500V
C5018	1-124-791-11	ELECT	1.0uF	20%	100V
C5019	1-130-489-11	MYLAR	0.033uF	5%	50V
C5101	1-128-488-11	CAP, ELECT	820uF		6.3V
C5102	1-126-941-11	ELECT	470uF	20%	10V
C5105	1-126-103-11	ELECT	470uF	20%	16V
C5106	1-126-103-11	ELECT	470uF	20%	16V
C5108	1-124-910-11	ELECT	47uF	20%	50V
C5109	1-126-967-11	ELECT	47uF	20%	35V
C5110	1-126-176-11	ELECT	220uF	20%	10V
C5111	1-130-495-00	MYLAR	0.1uF	5%	50V
C5113	1-124-455-00	ELECT	100uF	20%	16V
C5115	1-126-162-11	ELECT	3.3uF	20%	50V
C5116	1-126-154-11	ELECT	47uF	20%	6.3V
C5117	1-124-455-00	ELECT	100uF	20%	16V
C5120	1-130-495-00	MYLAR	0.1uF	5%	50V
C5122	1-124-464-11	ELECT	0.22uF	20%	50V
C5124	1-130-495-00	MYLAR	0.1uF	5%	50V
C5125	1-130-495-00	MYLAR	0.1uF	5%	50V
C5126	1-126-162-11	ELECT	3.3uF	20%	50V
		< DIODE >			
⚠D5001	1-809-609-11	DIODE	DBC10E		
D5002	1-808-899-11	DIODE	AG01-V2		
D5003	8-719-901-83	DIODE	1SS83		
D5005	1-809-610-11	DIODE	MTZJ20B-T-77		
D5006	8-719-912-20	DIODE	1SS120		
D5008	8-719-901-83	DIODE	1SS83		
D5009	8-719-901-83	DIODE	1SS83		
D5010	8-719-901-83	DIODE	1SS83		
D5011	8-719-901-83	DIODE	1SS83		
D5012	8-719-901-83	DIODE	1SS83		
D5013	1-809-611-11	DIODE	PHOTO COUPLER ON3131-R		
D5101	1-809-095-11	TRANSISTOR	RL2Z-LF-B1		
D5104	1-809-095-11	TRANSISTOR	RL2Z-LF-B1		
D5105	8-719-901-83	DIODE	1SS83		
D5106	8-719-901-83	DIODE	1SS83		
D5107	1-809-070-11	DIODE	AK04-V2		
D5108	8-719-010-34	DIODE	UZ-4.7BSC		
D5109	8-719-109-89	DIODE	RD5.6ES-B2		
D5110	8-719-981-94	DIODE	MTZJ-T-77-2.7A		
D5111	8-719-912-20	DIODE	1SS120		
D5112	8-719-912-20	DIODE	1SS120		
D5132	8-719-921-89	DIODE	MTZJ-13C		

Ref. No.	Part No.	Description			Remark
		< FUSE >			
⚠F5001	1-576-262-11	FUSE 125V 2A			
		< IC >			
IC511	1-810-060-11	IC	L5431-AA (REG)		
IC512	1-808-795-11	IC	SI3120CA (12V REG)		
IC513	1-808-795-11	IC	SI3120CA (12V REG)		
		< COIL >			
⚠L5001	1-424-623-11	COIL, LINE FILTER			
L5101	1-412-464-11	INDUCTOR, COIL 10uH			
L5103	1-543-699-11	CORE			
		< CIRCUIT, PROTECTOR >			
⚠PR511	1-576-237-11	PROTECTER, CIRCUIT			
		< TRANSISTOR >			
Q5001	1-809-604-11	TRANSISTOR	2SK1691-FA13		
Q5002	1-809-602-11	TRANSISTOR	2SC2274-F-AA		
Q5003	8-729-140-97	TRANSISTOR	2SB734-34		
Q5004	1-809-602-11	TRANSISTOR	2SC2274-F-AA		
Q5101	8-729-140-96	TRANSISTOR	KSC1008		
Q5102	8-729-021-82	TRANSISTOR	2SD1944-K		
Q5109	8-729-900-89	TRANSISTOR	DTC144ES		
Q5110	8-729-900-89	TRANSISTOR	DTC144ES		
		< RESISTOR >			
R5001	1-202-724-00	SOLID	2.7M	10%	1/2W
R5005	1-220-374-11	OXIDE-MT	0.47 3W		
R5010	1-220-375-11	OXIDE-MT	15K 3W		
		< TRANSFORMER >			
⚠T5001	1-692-048-11	SWITCH, TRANSFORMER			
**********					
*	A-6794-014-A	TB-1 BOARD, COMPLETE			
		**********			
*	3-946-543-01	HOLDER			
*	3-961-387-01	BRACKET, TERMINAL			
*	3-961-389-01	INDICATOR, DEC			
	7-685-548-19	SCREW +BTP 3×12 TYPE2 N-S			
	7-685-647-79	SCREW +BVTP 3×10 TYPE2 N-S			
		< CAPACITOR >			
C8501	1-161-063-00	CERAMIC	0.1uF	10%	50V
C8502	1-124-667-11	ELECT	10uF	20%	100V
C8503	1-164-073-11	CERAMIC	100PF	10%	50V
C8504	1-124-667-11	ELECT	10uF	20%	100V
C8505	1-126-154-11	ELECT	47uF	20%	6.3V

When indicating parts by reference number, please include the board.

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Replace only with part number specified.

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Ne les remplacer que par une pièce portant le numéro spécifié.

Ref.No.	Part No.	Description			Remark
C8506	1-124-667-11	ELECT	10uF	20%	100V
C8508	1-162-294-31	CERAMIC	0.001uF	10%	50V
C8509	1-162-294-31	CERAMIC	0.001uF	10%	50V
C8511	1-162-294-31	CERAMIC	0.001uF	10%	50V
C8512	1-162-294-31	CERAMIC	0.001uF	10%	50V
C8513	1-162-294-31	CERAMIC	0.001uF	10%	50V
C8514	1-162-294-31	CERAMIC	0.001uF	10%	50V
C8515	1-162-294-31	CERAMIC	0.001uF	10%	50V
C8516	1-161-061-11	CERAMIC	0.068uF	10%	50V
C8517	1-161-063-00	CERAMIC	0.1uF	10%	50V
C8518	1-124-455-00	ELECT	100uF	20%	16V
C8519	1-124-589-11	ELECT	47uF	20%	16V
C8521	1-162-294-31	CERAMIC	0.001uF	10%	50V
		< DIODE >			
D8501	1-809-605-11	DEODE	MTZ13C-T-77		
D8502	1-809-605-11	DEODE	MTZ13C-T-77		
D8503	1-809-605-11	DEODE	MTZ13C-T-77		
D8504	1-809-605-11	DEODE	MTZ13C-T-77		
D8505	1-809-605-11	DEODE	MTZ13C-T-77		
D8506	1-809-605-11	DEODE	MTZ13C-T-77		
D8507	1-809-605-11	DEODE	MTZ13C-T-77		
D8508	1-809-605-11	DEODE	MTZ13C-T-77		
D8509	1-809-605-11	DEODE	MTZ13C-T-77		
D8511	8-719-901-33	DIODE	1SS133		
D8512	8-719-901-33	DIODE	1SS133		
D8513	8-719-901-33	DIODE	1SS133		
D8514	8-719-901-33	DIODE	1SS133		
D8515	8-719-901-33	DIODE	1SS133		
D8516	8-719-901-33	DIODE	1SS133		
D8517	8-719-901-33	DIODE	1SS133		
D8518	8-719-901-33	DIODE	1SS133		
D8519	8-719-901-33	DIODE	1SS133		
D8520	8-719-901-33	DIODE	1SS133		
D8521	8-719-901-33	DIODE	1SS133		
D8522	8-719-901-33	DIODE	1SS133		
D8523	8-719-901-33	DIODE	1SS133		
D8524	8-719-901-33	DIODE	1SS133		
D8525	8-719-901-33	DIODE	1SS133		
D8526	8-719-901-33	DIODE	1SS133		
D8527	8-719-901-33	DIODE	1SS133		
D8528	8-719-901-33	DIODE	1SS133		
D8529	8-719-901-33	DIODE	1SS133		
D8530	8-719-901-33	DIODE	1SS133		
D8531	8-719-901-33	DIODE	1SS133		
D8532	8-719-901-33	DIODE	1SS133		
D8533	8-719-901-33	DIODE	1SS133		
D8534	8-719-901-33	DIODE	1SS133		
D8539	1-809-605-11	DEODE	MTZ13C-T-77		

Ref.No.	Part No.	Description			Remark
		< IC >			
IC851	8-759-820-42	IC	LA6458S (MIC AMP)		
IC852	1-809-585-11	IC	LB1475 (REMOTE CONTROL DECODER)		
		< COIL >			
L8501	1-410-521-11	INDUCTOR 100uH			
**********					
*	A-6794-012-A	TM-1 BOARD, COMPLETE			
		**********			
*	3-946-542-01	HOLDER			
		< INDICATOR TUBE >			
A7101	1-519-675-11	INDICATOR TUBE, FLUORESCENT			
		< CAPACITOR >			
C7101	1-126-154-11	ELECT	47uF	20%	6.3V
C7102	1-161-379-00	CERAMIC	0.01uF	20%	25V
C7103	1-126-154-11	ELECT	47uF	20%	6.3V
C7104	1-161-379-00	CERAMIC	0.01uF	20%	25V
C7105	1-161-379-00	CERAMIC	0.01uF	20%	25V
C7106	1-126-153-11	ELECT	22uF	20%	6.3V
C7107	1-161-379-00	CERAMIC	0.01uF	20%	25V
C7108	1-102-958-00	CERAMIC	20PF	5%	50V
C7109	1-102-958-00	CERAMIC	20PF	5%	50V
		< DIODE >			
D7101	8-719-901-33	DIODE	1SS133		
D7102	8-719-901-33	DIODE	1SS133		
D7103	8-719-901-33	DIODE	1SS133		
D7104	8-719-901-33	DIODE	1SS133		
D7108	8-719-901-33	DIODE	1SS133		
D7109	8-719-901-33	DIODE	1SS133		
D7110	8-719-901-33	DIODE	1SS133		
D7111	8-719-901-33	DIODE	1SS133		
		< IC >			
IC711		IC	M38102E5-**SP (TIMER CPU)		
IC712	1-808-855-11	IC	M6M80021P (CHANNEL MEMORY)		
IC713	1-810-787-11	IC	MN1381 (RESET)		
		< RESISTOR >			
R7103	1-202-731-00	SOLID	10M	10%	1/2W
		< SWITCH >			
S7101	1-692-216-11	SWITCH, PUSH (■STOP)			
S7102	1-692-216-11	SWITCH, PUSH (●REC)			
S7103	1-692-392-11	SWITCH, PUSH (AL RESET)			

When indicating parts by reference number, please include the board.

SECTION 7
MECHANISM ADJUSTMENTS

7-1. OPERATING THE MECHANISM WITH NO CASSETTE INSERTED (See Fig. 7-1-1.)

1) Attach black vinyl tape to the T. END and T. TOP sensors to prevent light from entering.
2) Push the TRAY LOCK LEVER in the direction of the arrow to maintain the unlocked condition. Release the lever just before the TRAY starts moving down.
3) In this condition, operation is possible in every mode. However, the following procedures are necessary to operate the unit in the REC, REW and R-SEARCH modes.

REC mode : Push the SAFETY SW LEVER to turn the SAFETY SWITCH (Erasure Prevention Switch) ON, then press the REC button. If the SAFETY SWITCH is not turned ON, the unit will enter the EJECT mode.

REW/R-SEARCH : After pressing the REW button, turn the TAKE-UP REEL ASS'Y by hand. Otherwise, the reel sensor will operate, setting the INITIAL mode after 2 to 3 seconds.

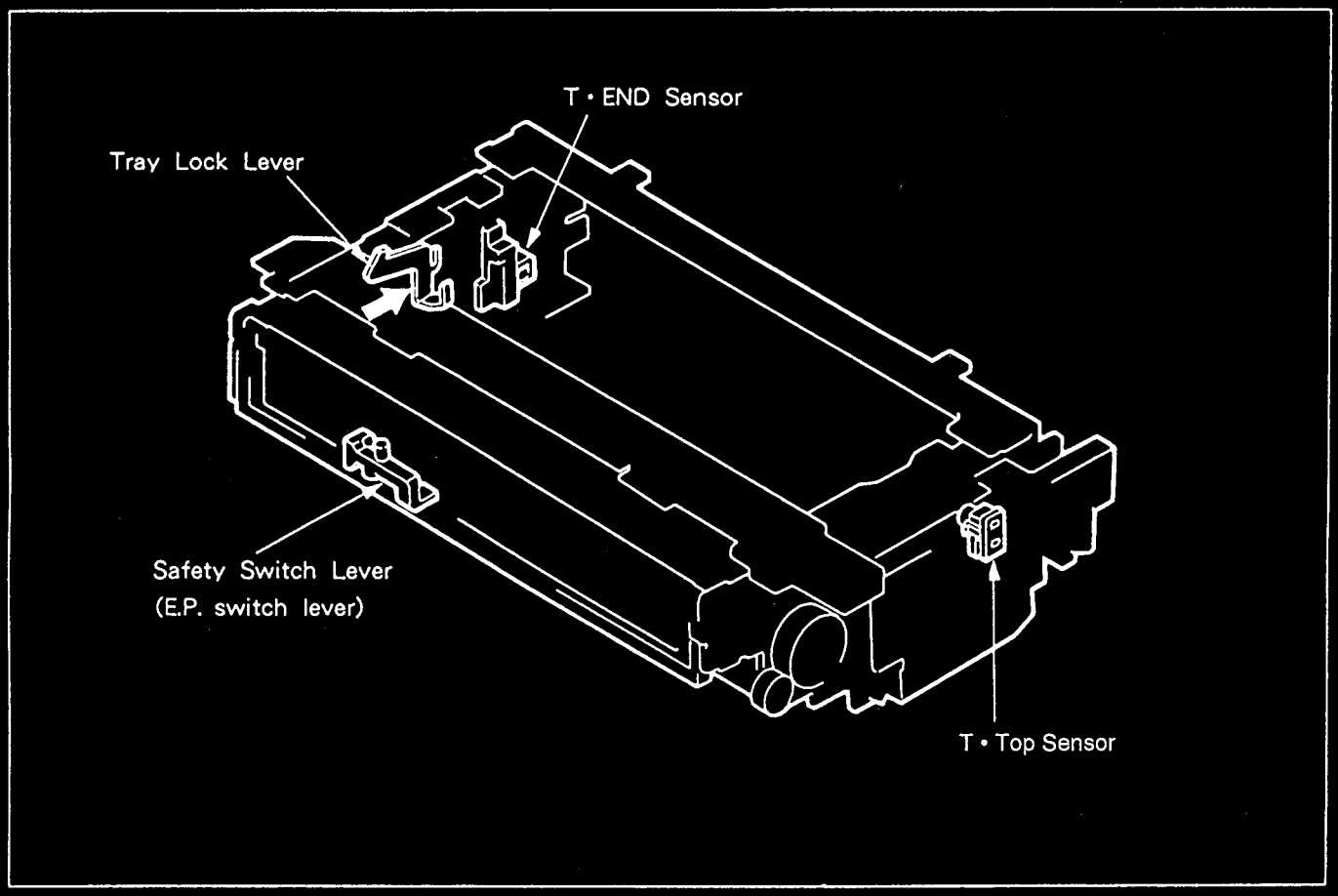


Fig. 7-1-1. Preparations for Adjustment

7-2. REEL TABLE HEIGHT ADJUSTMENT AND TORQUE CHECK

7-2-1.Reel Table Height (See Fig. 7-2-1.)

If the SUPPLY REEL ASS'Y or the TAKE-UP REEL ASS'Y is raplaced, it will be necessary to adjust the REEL TABLE height.

(1) Remove the COMPL CASSETTE MECHANISM as instructed in P.101.
(2) Attach the master plane (H-7099-279-H) and reel disc height jig (H-7099-038-H) in the direction of the arrows.
(3) Confirm that, when the gauge stops, the REEL TABLEs are not in contact with surface A of the plate and side of the REEL TABLEs are in contact with surface B.
(4) If the REEL TABLE is in contact with surface A, remove a spacer and check again.
(5) If the REEL TABLE is not in contact with surface B, add a spacer and check again.
(6) Remove the master plane.
(7) Set the EJECT mode with the mode selector.
(8) Mount the COMPL CASSETTE MECHANISM as instructed in P.101.

Note:

- Adjust the reel table height by adding or removing spacers(0.13t, 0.25t, 0.3t, 0.4t and 0.5t)as appropriate so that the height meets the specifications. Use the same method for both the TAKE-UP REEL TABLE and the SUPPLY REEL TABLE.
  (The 0.5t washer is included as the standard washer for the SUPPLY REEL ASS'Y. The 0.4t washer is included as the standard washer for the TAKE-UP REEL ASS'Y.)
- If the height of the reel table is not within the specified value, the tape edge might be damaged as a result, or the tape path adjustment might not be possible to make.

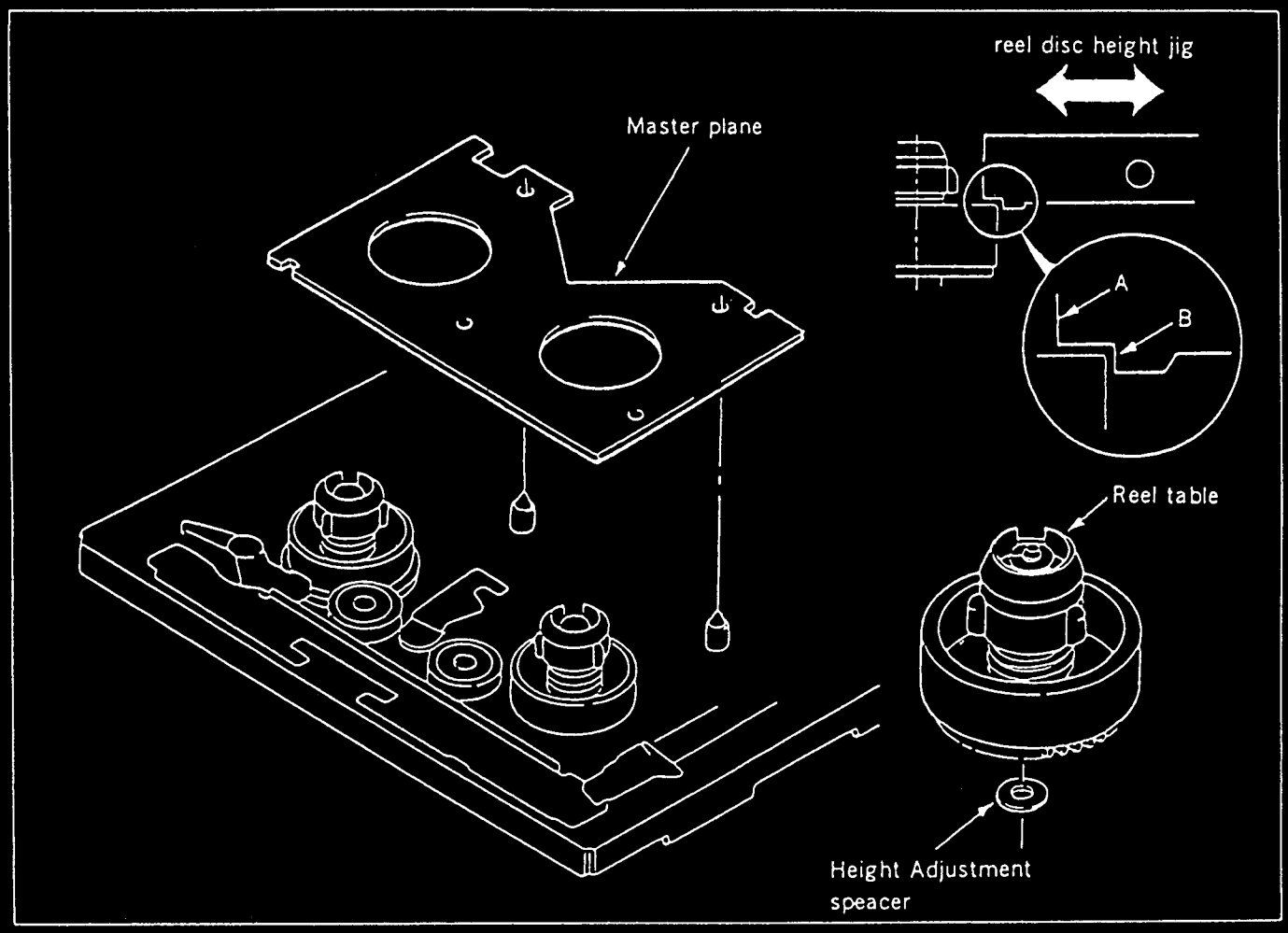


Fig. 7-2-1. Reel Table Height Adjustment

7-2-2.Torque Check (See Fig. 7-2-2.)

1) Set the unit to operating condition without a cassette inserted as instructed in 7-1.
2) Measure the SUPPLY REEL TABLE torque in the REW mode, and confirm that it is 750gcm or more. Perform this measurement keeping the torque gauge in a fixed position with your hand (locked torque).
3) Measure the TAKE-UP REEL TABLE torque in the F.FWD mode, and confirm that it is 600gcm or more (locked torque).
4) Measure the TAKE-UP REEL TABLE torque in the playback mode (SP tape speed), and confirm that it is within 80 through 140gcm (locked torque).
5) Measure the SUPPLY REEL TABLE torque in the REV (F-SEARCH) mode, and confirm that it is within 150 through 240 gcm (locked torque).
6) After confirming that torque readings are within the specifications for each mode, check the following :
   ⓐ Dirt on the capstan motor and the REEL PULLEY groove.
   ⓑ Deterioration of the REEL DRIVE BELT.
   ⓒ Deterioration of the FRICTION GEAR ASS'Y felt (torque during playback).
   ⓓ Wear and damage of the COMPL CLUTCH MECHANISM and the reel drive system gears.

Note1 : Items ⓑ, ⓒ and ⓓ require replacement if found defective.

Note2 : The measured value of torque during FF and REW represents the value 2 seconds after starting.

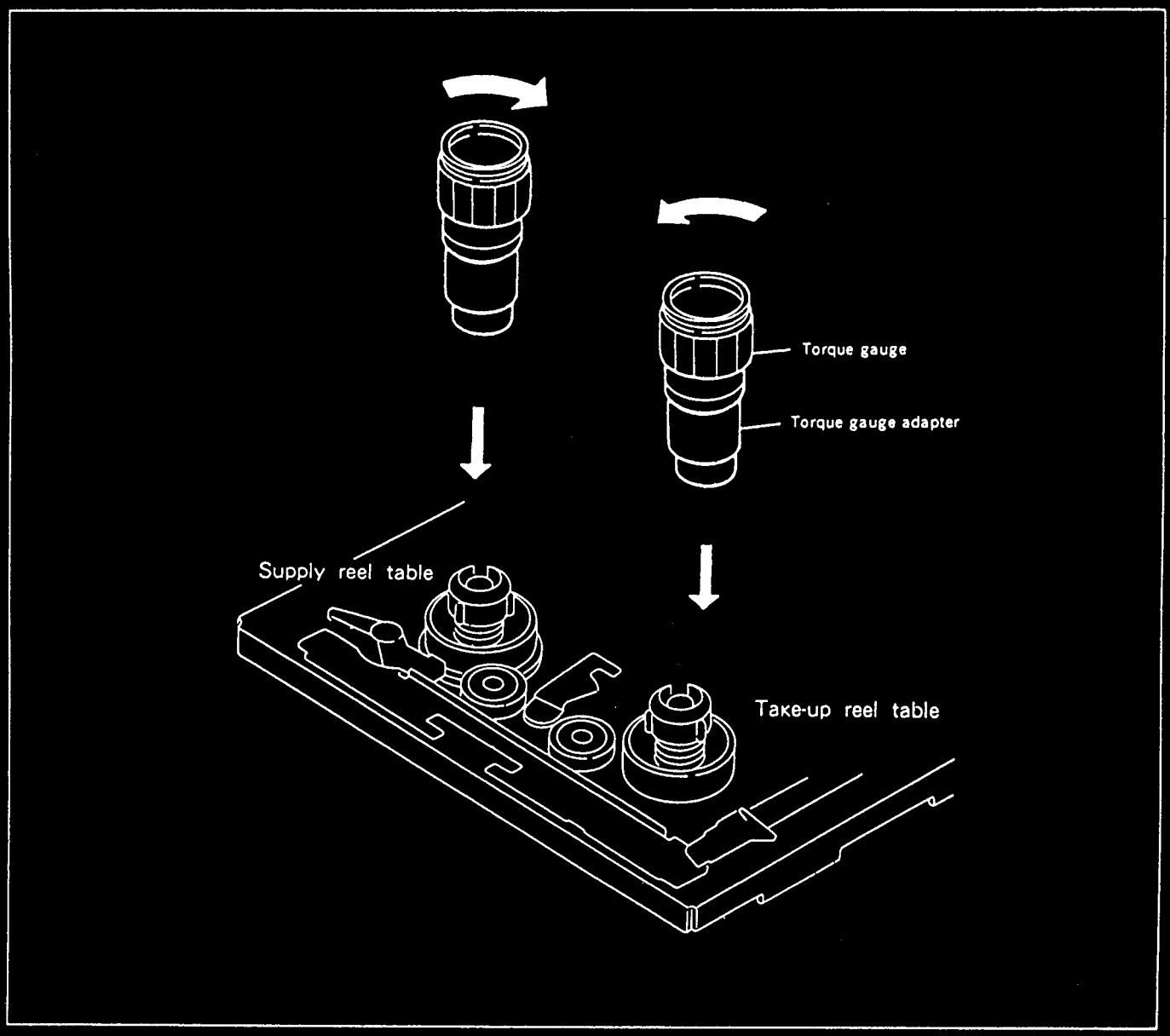


Fig. 7-2-2. Checking REW/FF/PLAY Torque

7-3. TENSION POLE (BACK TENSION GUIDE) POSITION ADJUSTMENT AND BACK TENSION TORQUE CHECK

7-3-1. Tension Pole (Back Tension Guide) Position Adjustment (See Fig. 7-3-1.)

1) Remove the COMPL CASSETTE MECHANISM as instructed in P.101.
2) Set the PLAY mode with the mode selector (VHJ-0050)
3) Confirm that the space between the end of chassis and the Tension arm is from 4mm to 6mm.
4) In case the tension pole is not withim 4-6mm, adjust it by loosening the screw ④ a little and changing the mounting position of the BAND HOLDER ⑤ in the direction of the arrow Ⓐ.
5) Set the EJECT mode with the mode selector.
6) Mount the COMPL CASSETTE MECHANISM as instructed in P.101.
7) Confirm that back tension torque is within 42± 5gcm, as instructed in 7-3-2. below.

7-3-2. Back Tension Torque Chack (See Fig. 7-3-1.)

1) Attach the cassette torquemeter (VHJ-0016) and set the PLAY mode.
2) Confirm that back tension torque is within 50 ± 10gcm.
3) In case back tension torque dose not meet the above specification, proceed as follows:

ⓐ Clean the portion where the brake band (BAND HOLDER ASS'Y) ⑦ of the SUPPLY REEL ASS'Y ⑥ makes contact.

ⓑ Confirm that the brake band of the BAND HOLDER ASS'Y ⑦ does not make wear and that it is clean. If wear or dirt is found, replace the band holder assembly ⑦ as instructed in P.104.

ⓒ Raplace the TENSION LEVER ASS'Y SPRING COIL ⑧.

Note : Always follow procedures in 7-3-1. Tension Pole Position Adjustment after performing ⓐ, ⓑ and ⓒ.

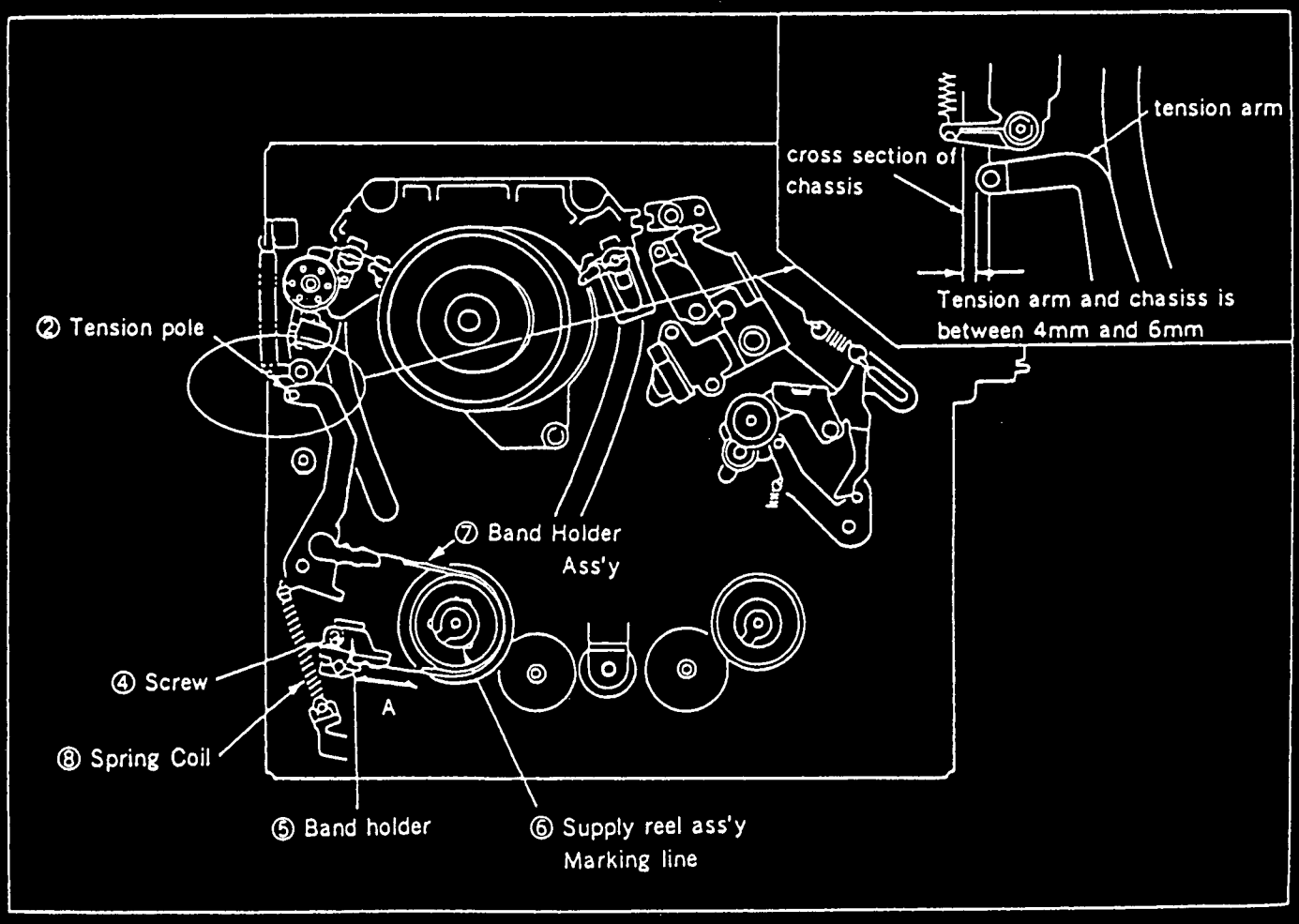


Fig. 7-3-1. Tension Pole Positioning Adjustment

7-4. TAPE PATH ADJUSTMENT

The tape path mechanism is precisely adjusted at the factory. Normally no readjustment is required, but checking and/or adjustment is necessary when parts of the tape path mechanism among those shown in the figure below (See Fig. 7-4-1.) have been removed or replaced after a long period of use. This operation consists of adjusting the various guides so that the tape drawn out from the supply reel runs smoothly along the DRUM (CYLINDER) lead surface. A way of grasping the tape path condition by electronic means is monitoring the video head output envelope waveform with an oscilloscope. However, the fact that visual observation is essential in order to know whether the tape is running through the various guides in a smooth and natural way should be kept in mind when checking and adjusting.

Also remember that the position of tape guides is not greatly affected by the replacement of the UPPER DRUM (UPPER CYLINDER) or the COMPL DRUM (COMPL CYLINDER), provided that it is correctly performed, and that only the replaced parts should be adjusted after replacing a tape guide or COMPL HEAD BRACKET, since the position of the other tape guides shall not change considerably.

7-4-1. Preparations for Adjustment

(1) Clean the tape transport surfaces (See Fig. 7-4-1.).

(2) Connect the oscilloscope. Connect the channel 1 probe to the envelope waveform test point, and the channel 2 probe to the SW25 (RF SW P) test point. During adjustment, apply a trigger to the low side of the SW25 (RF SW P) in order to monitor the waveform output from channel 1 of the video head.

Note : Since oscilloscope connection points differ according to the model, refer to the "Test Point for Tape Path Adjustment" allocation figure in the electric circuit adjustment section of the service manual book.

(3) Use a dentist's mirror for visual observation of tape path condition.

(4) Use an eccentric driver (VHJ - 0003) for adjustment of the guide rollers.

(5) When adjusting height of the fixed guide, guide rollers or COMPL head bracket, turn the special nut or the upper flange clockwise to push the tape downward, and counterclockwise to make the tape rise up.

(6) Do not use the damaged cassette tapes for tape path adjustment.

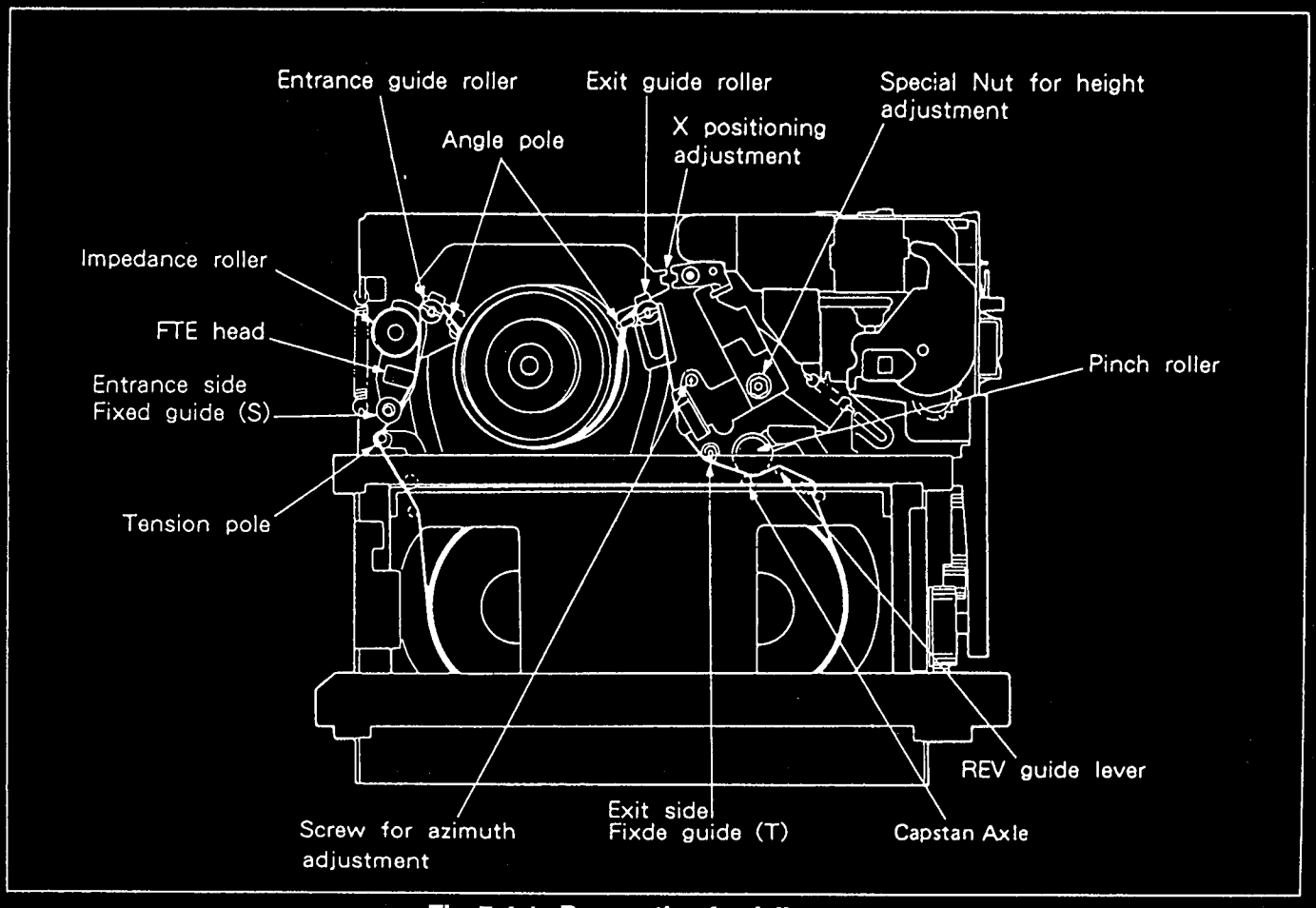


Fig. 7-4-1. Preparation for Adjustment

7-4-2. Adjustment by Visual Observation after Guide Roller, COMPL Head Bracket Replacement

Perform this adjustment after removing or replacing any of the above parts. Only for the replaced or removed parts, play back an alignment tape (NTSC HiFi 400Hz) beforehand and adjust height by visual observation.

(1) Fixing Guide (See Fig. 7-4-2.)
Adjust so that the upper edge of the tape and the upper flange of the fixing guide, and the lower edge of the tape and the lower flange of the fixing guide do not touch. Also adjust so that clearances A and B become equal.

(2) Guide Rollers (See Fig. 7-4-3.)
The tape should not be curled by the guide roller upper and lower flanges. It should also run smoothly, without moving up and down on the DRUM (CYLINDER) lead surface.

Note : An excessive guide roller pressure may cause tape damage.

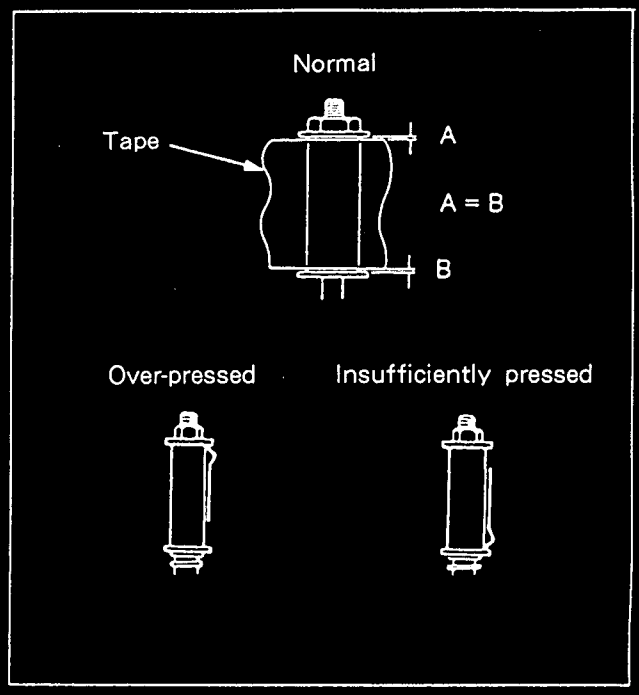


Fig. 7-4-2. Temporary Adjustment of Fixing Guide

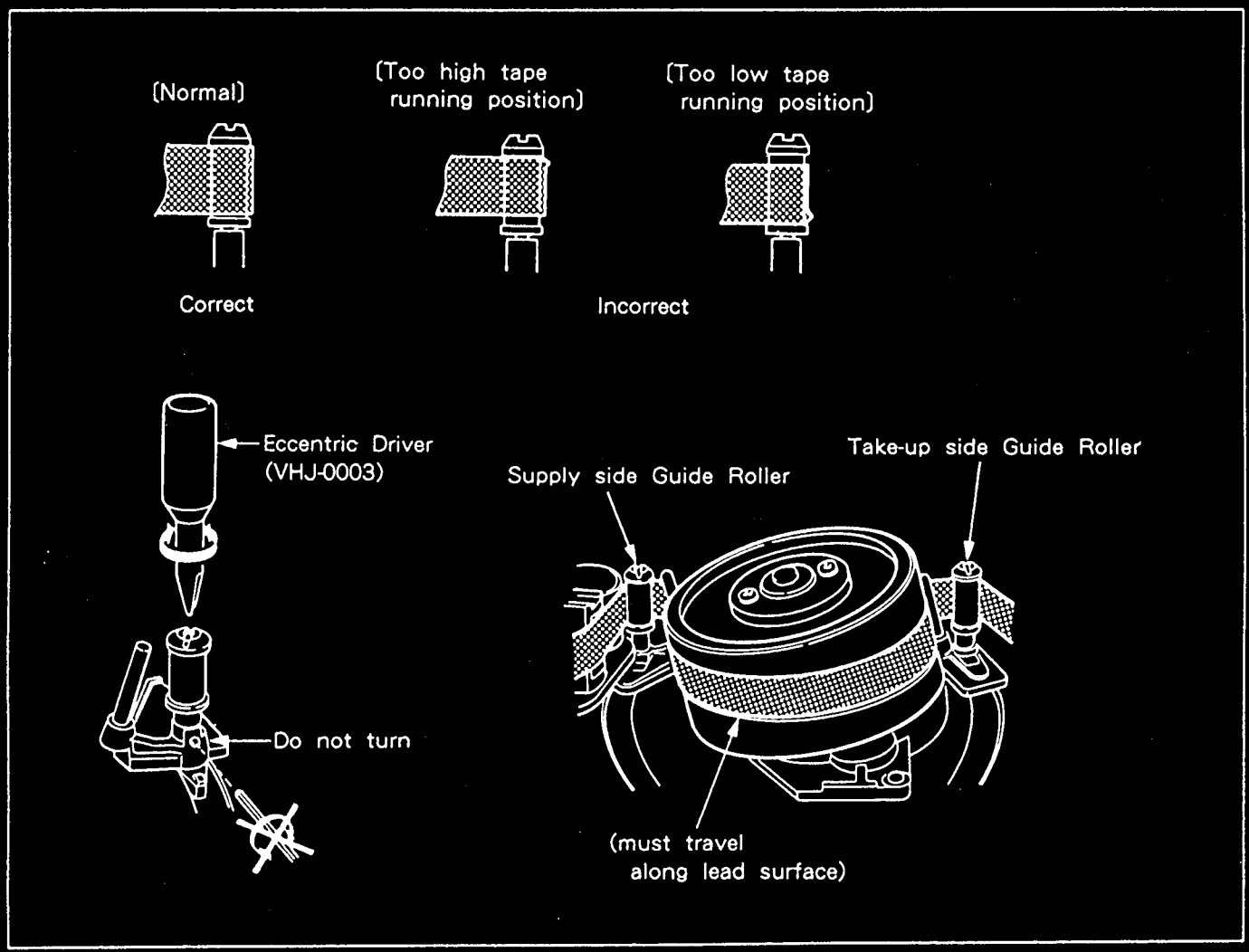


Fig. 7-4-3. (2) Pre-set for Guide Roller

(3) COMPL Head Bracket (ACE Head) (See Fig. 7-4-4.)

Adjust the special nut so that the tape edge runs between the audio head upper end and the control head lower end. Gaps A and B should be of about the same width. Since at this point it is only required that the control signal is picked up and the servo circuit works normally, no adjusting screws except the COMPL head bracket special nut should be touched.

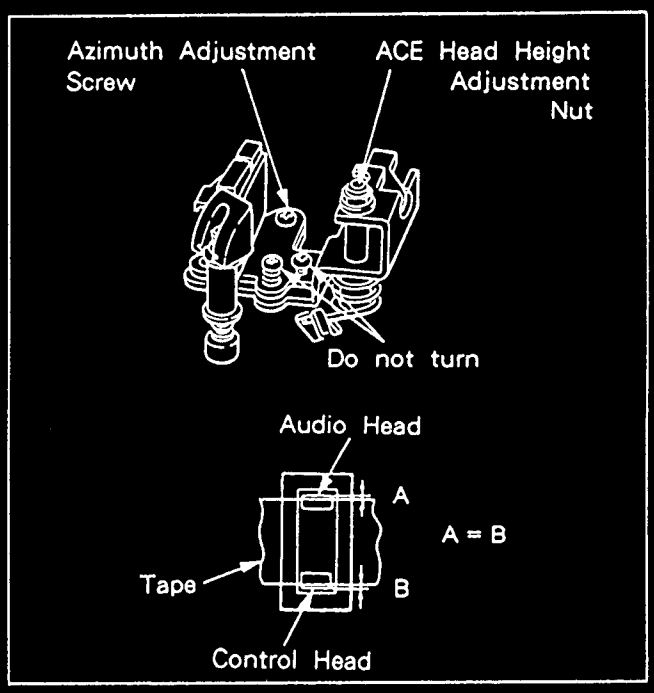


Fig. 7-4-4. (3) Pre-set for Compl Head Bracket

7-4-3.Tape Path Check of Entrance Side Fixed Guide (S)(See Fig. 7-4-5.)

The fixed guide (S) of the entrance side does not require adjustment in this mechanism.

Confirm that the lower edge portion of the tape is running along the lower flange of the entrance side fixed guide (S).

The tape should not be curled by the entrance side fixed guide (S) upper and lower flanges.

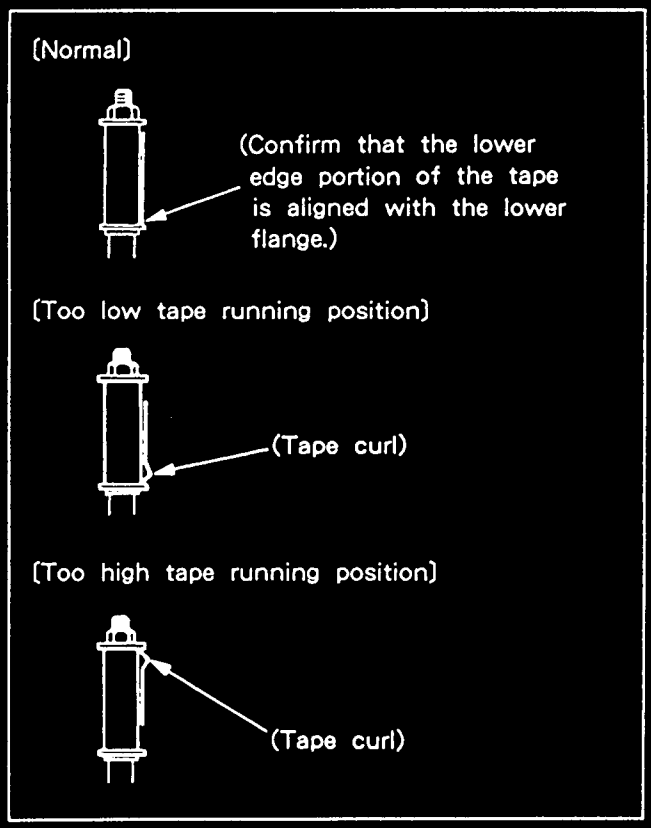

[Normal]
(Confirm that the lower edge portion of the tape is aligned with the lower flange.)
[Too low tape running position]
(Tape curl)
[Too high tape running position]
(Tape curl)

Fig. 7-4-5. Fixed Guide(S)

7-4-4.Guide Roller Adjustment (See Fig. 7-4-6.)

1) Play back the alignment tape (NTSC HiFi 400Hz), press the tracking control key and adjust the envelope waveform to the maximum level.
2) Loosen the entrance and exit guide rollers by rotating them counterclockwise, then rotate them clockwise alternately until they are fastened and a flat video output waveform is obtained.
3) Confirm that the envelope waveform is not deformed, and check visually that no curling occurs at the guide roller upper and lower flanges.
4) Press the tracking control key and set the envelope waveform level to approx. 50% of the maximum. In this condition, confirm whether the envelope waveform is flat. It will not, showing valleys or peaks at the first half (entrance) or second half (exit), if the guide roller pressure is excessive or insufficient.
   In case there is unevenness in the first half (entrance), adjust the entrance side guide roller. If the second half (exit) shows trouble, adjust finely the exit side guide roller.

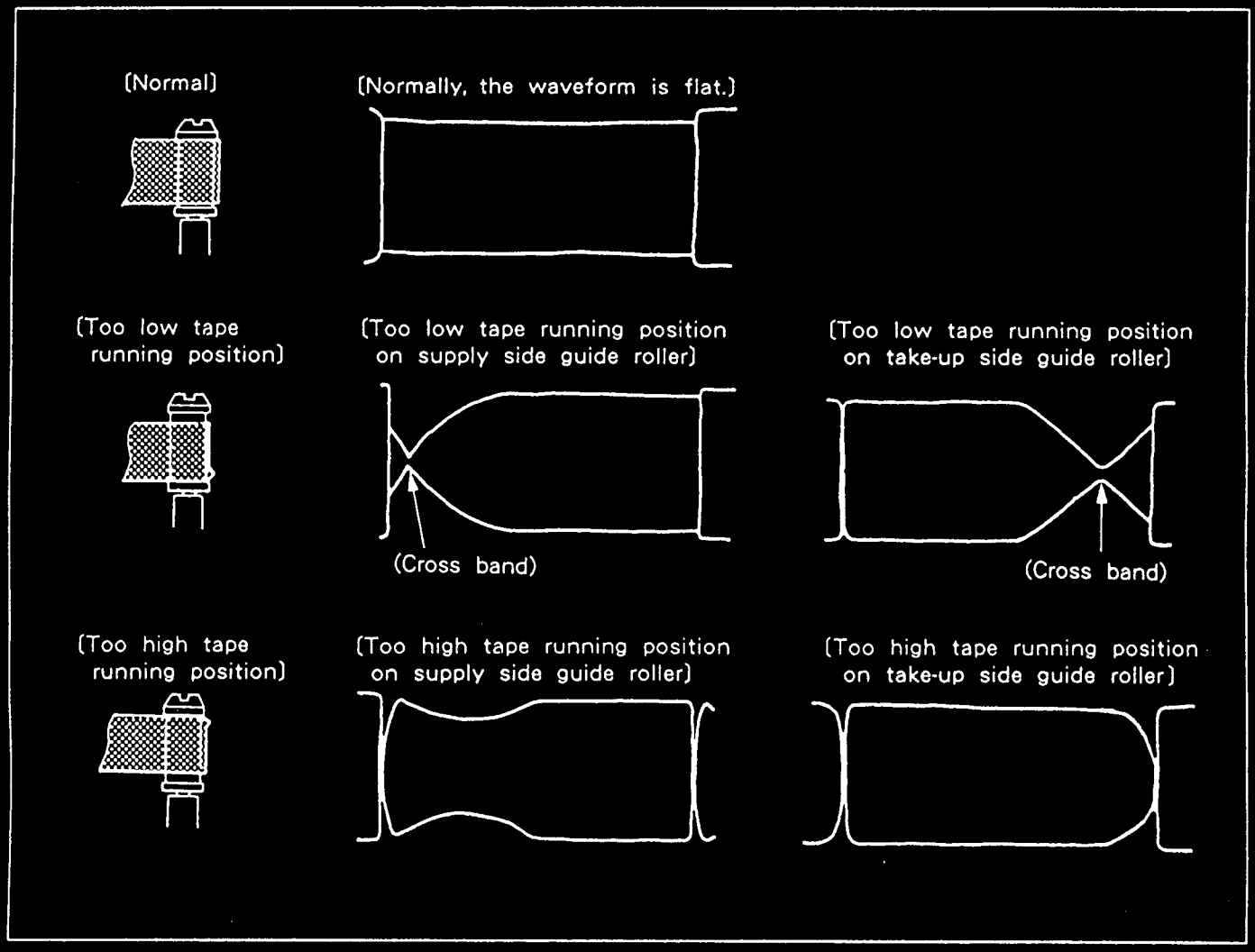

(Normal)
(Normally, the waveform is flat.)
(Too low tape running position)
(Too low tape running position on supply side guide roller)
(Cross band)
(Too low tape running position on take-up side guide roller)
(Cross band)
(Too high tape running position)
(Too high tape running position on supply side guide roller)
(Too high tape running position on take-up side guide roller)

Fig. 7-4-6. Guide Roller Adjustment

7-4-5.Tape Path Check of Exit Side Fixed Guide (T)(See Fig. 7-4-7.)

The fixed guide (T) of the exit side does not require adjustment in this mechanism.

Confirm that the lower edge portion of the tape is running close to the lower flange of the exit side fixed guide (T).

The tape should not be curled by the exit side fixed guide (T) upper and lower flanges.

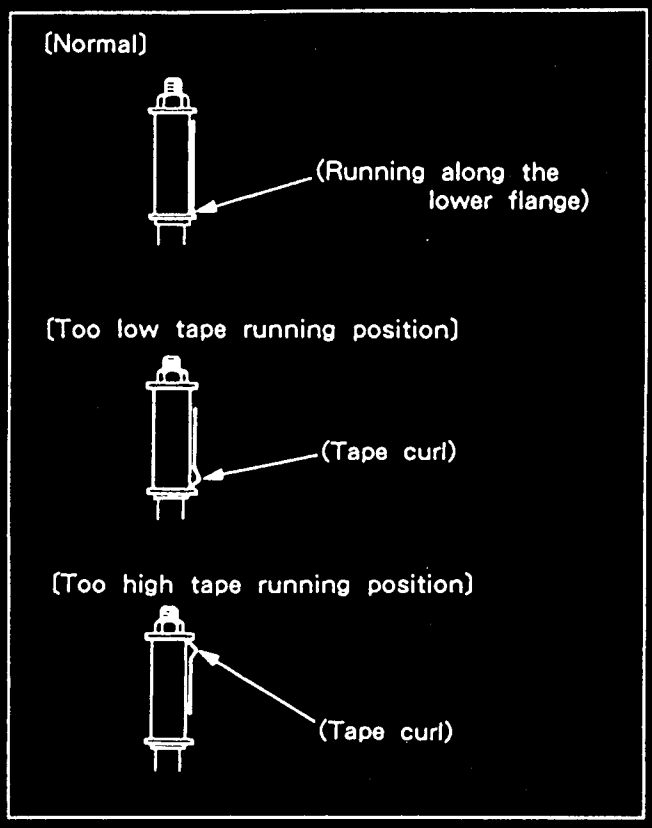


Fig. 7-4-7. Fixed Guide(T)

7-4-6.COMPL Head Bracket (ACE Head) Adjustment

(1) Height Adjustment and Azimuth Adjustment (See Fig. 7-4-8.)

1) Load the alignment tape (NTSC HiFi 400Hz) and set the PLAY mode.
2) Monitor the audio output waveform with the oscilloscope.
3) Rotate the azimuth adjustment screw until the audio output waveform amplitude is maximum.
4) After loosening the ACE head height adjustment special nut, rotate it slowly clockwise until amplitude of the audio output waveform is maximum, then adjust it finely clockwise to the point just before the said waveform amplitude begins to decrease.
5) Rotate the azimuth adjustment screw until amplitude of the audio output waveform is maximum.
6) Confirm that the audio output waveform amplitude does not fluctuate.

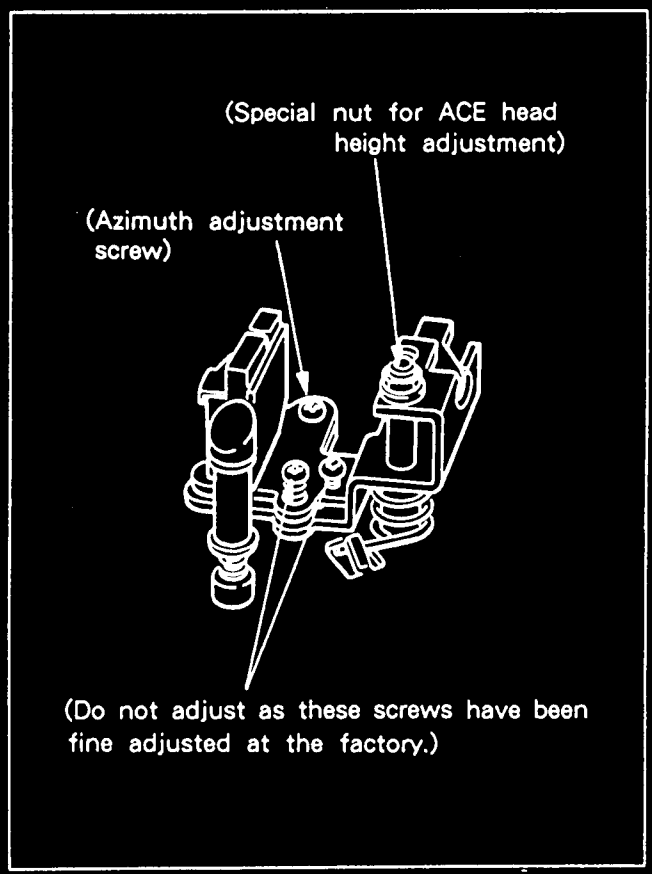

(Special nut for ACE head height adjustment)
(Azimuth adjustment screw)
(Do not adjust as these screws have been fine adjusted at the factory.)

Fig. 7-4-8. Compl Head Bracket

(2) Tracking (X Value) Adjustment (See Fig. 7-4-9.)

1) Load the alignment tape (NTSC HiFi 400Hz) and set the PLAY mode.
2) Set tracking to the center position with the tracking control key (See Note below).
3) Rotate the stopper bracket fixing screw 180° counterclockwise.
4) Monitor the video head output envelope waveform with the oscilloscope.
5) Adjust the stopper bracket position so that amplitude of the envelope waveform becomes maximum at the tracking center and the envelope waveform amplitude changes by the same amount when shifting the tracking center by pressing the plus (+) and minus (−) tracking control keys.
6) Tighten the fixing screw.
7) (Model for LP mode tape speed capability)
Playback the alignment tape (VHJ-0052) and set the tracking to the center using a tracking control key.
Then confirm that the playback picture on screen is normal. If not, Make readjustment by referring to items 1) through 7). To readjust, playback MH-1 and finely adjust the position of the stopper bracket within the range in which the amplitude of the envelope waveform can be held to a maximum.
8) Perform servo circuit SW PHASE (Switching position) adjustment.

Note : For models equipped with auto tracking, always set to the manual tracking mode before adjustment. To confirm the tracking center position, press the tracking keys (+, −) and observe the front panel clock display. It will read "T − : −" at the tracking center, "T − : , T − − : " when keeping the minus (−) key pressed, and "T : −, T : − −" when keeping the plus (+) key pressed. The time indication will be restored 2 to 3 seconds after the tracking keys are released.

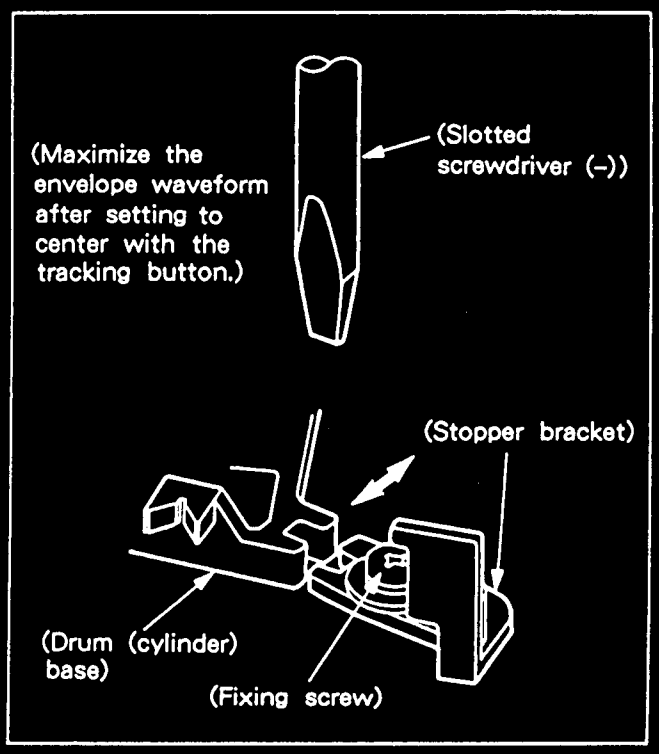

(Maximize the envelope waveform after setting to center with the tracking button.)
(Slotted screwdriver (−))
(Stopper bracket)
(Drum (cylinder) base)
(Fixing screw)

Fig. 7-4-9.

7-4-7.Checking After Adjustment

Tape running may show a slight change depending upon the type of the cassette tape (thick or thin tape), the start, middle, or end of cassette tape winding, etc. After performing the tape path adjustment with use of an alignment tape, be sure to check the following points. Incidentally, the alignment tape to be used should be T-120 or T-160 cassette should be a good one without any damage to it.

(1) Try to play back the alignment tape (NTSC HiFi 400Hz) and confirm that the envelope waveform rise immediately and that there is no flucuation in the envelope waveform and the audio output waveform.

(2) Load a cassette tape T-120 and start recording operation in the standard mode. 1 kHz should be fed to the audio input terminal when recording. After recording, the following points should be checked.

1. When the recorded portion is played back, the envelope waveform rise immediately, and no fluctuation in the envelope waveform is observed. Also, no speed drop occurs during the first half period or the last half period. Further, check to be sure that no fluctuation occurs in the audio waveform. Also confirm that neither the tape curling or derailing is caused on the upper or lower flange and the on the read side of the drum.
2. Confirm that no tape curling or derailing occurs in the upper or lower flange of each tape guide and the read side of the drum during each mode of operation, namely, FF, REW, F. SEARCH, and R. SEARCH.
3. Confirm that the envelope waveform rise immediately after changing the mode directly to the PLAY from each mode of FF, REW, F. SEARCH, R. SEARCH, or POWER OFF (INITIAL) and that no tape curling or derailing occurs in the upper or lower flange of the each tape guide and on the read side of the drum.

(3) Load a T-160 cassette tape and perform recording operation in the SP mode. 1 kHz should be fed to the audio input terminal when recording. Now, confirm that the envelope waveform rise immediately upon starting the playback of the recorded portion, and that neither fluctuation in the envelope waveform nor a speed drop occurs during the first half period or the last half period. Also confirm that no tape curling or derailing is caused in the upper or lower flange of each tape guide and on the drum lead surface.

(4) Perform recording for 60 seconds in the SP mode at the start of T-160 cassette winding. Play back the recorded portion and repeat the F.SEARCH ↔ R.SEARCH ten times, following which confirm that no damage is done to the tape edge. If any damage is found on the tape edge, a proper step must be taken as below depending upon the symptom obserbed.

1. When a sawtooth shaped damage is caused on underside of the tape edge by the REV guide
   1) Check to see if damage is done to the tape by the REV guide.
   2) Loosen the tilt adjustment screw of the ACE head bracket by turning it 135° counter-clockwise.
   3) Make readjustment of the ACE head bracket (azimuth, height and adjustment of X value) by seeing item P.11.
   4) Confirm that no fluctuation in the audio level is caused by loosening the tilt adjustment screw in steps 1) and 2) above. Move the screw a little back if any fluctuation is found (but never move it back to the original position). After adjusting the tilt adjustment screw is readjusted, perform step 4) once again.
   5) Confirm again that the T-160 cassette tape does not sustain any damage.
   6) Perform the recording and playback on the T-120 and T-160 cassette tape and confirm that no fluctuation occurs in the envelope waveform and the audio waveform.

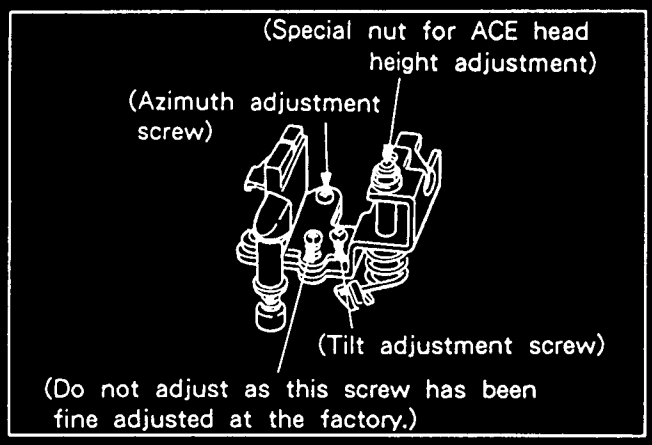

(Special nut for ACE head height adjustment)
(Azimuth adjustment screw)
(Tilt adjustment screw)
(Do not adjust as this screw has been fine adjusted at the factory.)

Fig. 7-4-10. Compl Head Bracket

2. If damage in the form of a sawtooth or a streak is found on the tape edge
   1) Check if a large amount of magnetic particles is adhered to the exit-side guide roller. If magnetic particles cannot be removed in spite of repeated cleaning, the guide roller must be replaced.
   2) Confirm if the tape is held too tightly by the exit-side guide roller, or if the last half of the envelope waveform is flat. If the type is found held too tightly, readjustment should be made by referring to 7-4.
   3) Recheck if the damage is still caused on the T-160 tape.
      If similar damage is still found on the tape, the exit-side guide roller should be loosened about 20° counterclockwise.
   4) Check once again that no fluctuation is caused in the envelope waveform or the audio waveform by loosening the exit-side guide roller. To do this, record and play back the T-160 cassette tape.

(5) Perform recording for 60 seconds in the SP mode at the near end of the T-160 cassette tape. Play back the recorded portion and repeat the F. SEARCH ↔ R. SEARCH ten times, following which a check should be made to see if damage is still done to the tape edge.
If a damage in the form of a sawtooth or a streak is still occurred on the tape edge by the upper lounge of entrance side guide roller, proceed with the step given below.
1. Check if a large amount of magnetic particles is adhered to the entrance-side guide roller. If the magnetic particles cannot be removed in spite of repeated cleaning, the guide roller must be replaced with new one.
2. Confirm if the tape is held too tightly by the entrance-side guide roller, or if the first half of the envelope waveform is flat. If the tape is found held too tightly, readjustment should be made by referring to 7-4.
3. Recheck if the damage is still caused on the T-160 tape.
   If the damage is still found on the tape, the entrance-side guide roller should be loosened about 20° counterclockwise.
4. Check once again that no fluctuation is caused in the envelope waveform or the audio waveform by loosening the entrance-side guide roller. To do this, record and play back the T-160 cassette tape.

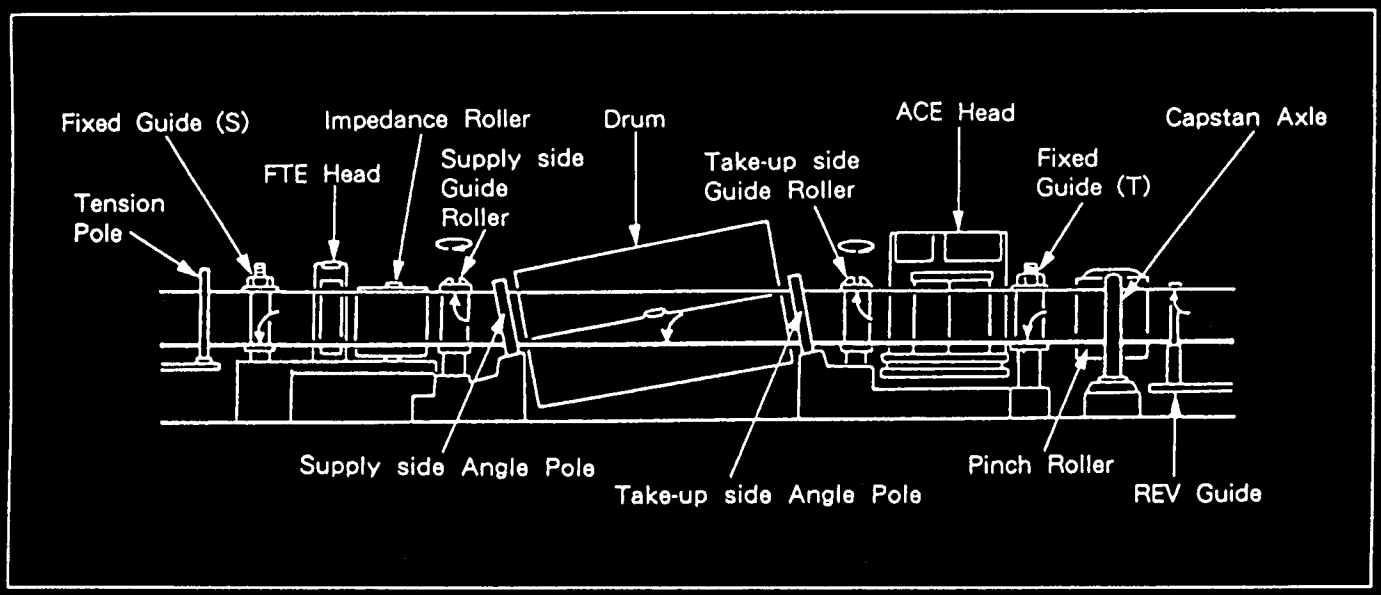
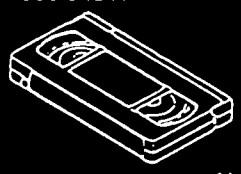


Fig. 7-4-11.

7-5. SERVICE JIGS

No.	Jig	Jig No.	Remarks
1	Alignment tape (MH-1)	H-7099-046-H	NTSC-NORMAL
	Alignment tape (NTSC HiFi 400Hz)	H-7099-153-H	NTSC MONOSCOPE
2	Eccentric screwdriver (VHJ-0003)	J-6082-044-A	For tape path adjustment
3	Nut box (VHJ-0048)	J-6082-045-A	For tape path adjustment
4	Torque gauge	H-7099-039-H	For reel tale-up torque measurement
5	Torque gauge adapter	H-7099-035-H	For reel take-up torque measurement
6	Fixed guide height gauge (VHJ-0053)	J-6082-052-A	For fixed gaude (S) height adjustment
7	Torque gauge screwdriver (VHJ-0014)	J-6082-047-A	For screw fastening torque adjustment
8	3mm dia. bit for torque screwdrirer (VHJ-0045)	J-6082-048-A	Spare bit for the torque gauge screwdriver
9	Video head removing tool (VHJ-0041)	J-6082-049-A	For upper drum removal
10	Mode selector (VHJ-0050)	J-6082-050-A	For mechanism mode selection
11	Master plane	H-7099-279-H	Reel table height
12	Reel disc height jig	H-7099-038-H	Reel table height
13	Mode selector relay board (VHJ-0075)	J-6090-008-A	Relay board for mode selector
14	Torque cassette (VHT-063S) (NTSC)	J-6082-011-A	For back tension torque, For REW torque
15	26-pin flexible flat cable (VHJ-0064)	J-6090-006-A	Spare cable for mode selector
16	7-wire flat cable (VHJ-0076)	J-6090-009-A	Spare cable for relay board
17	REV guide lever removing tool (VHJ-0073)	J-6090-007-A	For REV guide lever removal

H-7099-046-H

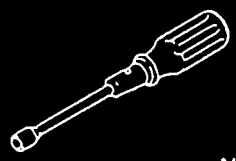


H-7099-153-H No. 1

J-6082-044-A (VHJ-0003)

No. 2

J-6082-045-A (VHJ-0048)



No. 3

H-7099-039-H

No. 4

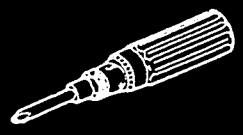
H-7099-035-H

No. 5

J-6082-052-A (VHJ-0053)

No. 6

J-6082-047-A (VHJ-0014)

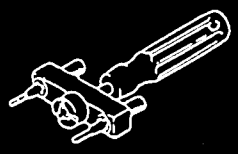


No. 7

J-6082-048-A (VHJ-0045)

No. 8

J-6082-049-A (VHJ-0041)



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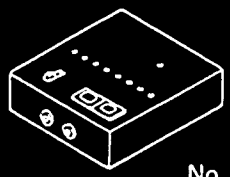
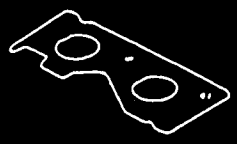


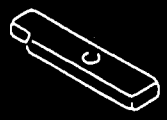
No. 10

H-7099-279-H



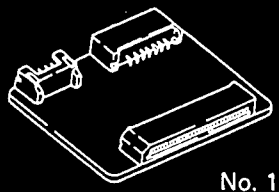
No. 11

H-7099-038-H



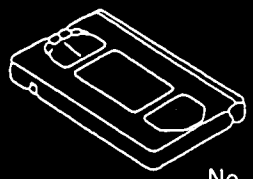
No. 12

J-6090-008-A (VHJ-0075)



No. 13

J-6082-011-A

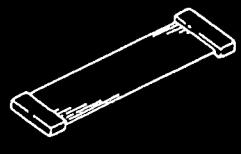


No. 14

J-6090-006-A (VHJ-0064)

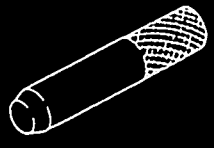
No. 15

J-6090-009-A (VHJ-0076)



No. 16

J-6090-007-A (VHJ-0073)



No. 17

7-6. MECHANISN MAINTENANCE AND CHECKING

7-6-1. Periodic Checking and Maintenance Items and Service Jigs

The following maintenance and periodic checking procedures are recommended to ensure proper operation, and to protect the tape from dirt and damage. Also these procedures should always be followed after repairing the unit.

(1) PERIODIC CHECK ITEMS

○ Cleaning ◎ Confirmation △ Lubrication □ Exchange

Part	Usage Time (hours)	500H	1000H	1500H	2000H	2500H	3000H	3500H	4000H	4500H	5000H
Tape Path System	ASSY, HOLDER, BAND		◎		□		◎		□		◎
	COMPLE, CYLIDER, 2N4P	○	○	○	○	○	○	○	○	○	○
	ASSY, CYLINDER, UPR, 2N4P	○	◎ (□)	◎ (□)	◎ (□)	◎ (□)	◎ (□)	◎ (□)	◎ (□)	◎ (□)	◎ (□)
	SPECIAL WASHER	○	○	○	○	○	○	○	○	○	○
	TAPE GUIDE	○	○	○	○	○	○	○	○	○	○
	COMPL, BRACKET, HEAD	○	○	○	○	○	□	○	○	○	○
	ASSY, LEVER, REV GUIDE	○	○	○	○	○	○	○	○	○	○
	COMPLE, PINCH POLLER	○	○	○	□	○	○	○	□	○	○
	ASSY, GUIDE, ROLLER	○	○	○	○	○	○	○	○	○	○
	HEAD, FULL ERASE	○	○	○	○	○	□	○	○	○	○
	ROLLER, IMPEDANCE				○ △				○ △		
	ASSY, EARTH, CYL.						□				
Reel Drive System	ASSY, REEL, SUPPLY		○		○ △		○		○ △		○
	ASSY, REEL, TAKE UP		○		○ △		○		○ △		○
	ASSY, GEAR, ONEWAY		○		○ △		○		○ △		○
	GEAR, REEL TAKE UP		○		○ △		○		○ △		○
	COMPLE, IDLER,CLUTCH				△				△		
	ASSY, IDLER		◎		◎		□		◎		◎
	PULLY, REEL				△				△		
	MOTOR, CAPSTAN	○	○	○	○	○	○	○	○	○	□
	BELT, REEL DRIVE				□				□		
	ASSY, GEAR, FRICTION		◎		△ □		◎		△ □		◎
Brake	ASSY, BRAKE SUB T		◎		◎		◎ □		◎		◎
	ASSY, BRAKE, SUPPLY		◎		□		◎		□		◎
	ASSY, BRAKE, TAKE UP		◎		□		◎		□		◎
	ASSY, BRAKE, CAPSTAN		◎		□		◎		□		◎
Loading Drive System	HOLDER, WORM				△				△		
	ASSY, LOADING MOTOR						□				
	BELT, LOADING				□				□		
	GEAR, HELICAL				△				△		
	CAM, MODE				△				△		
	CAM, MAIN				△				△		
Performance Check	FF, REW, REV, PLAY TORQUE		◎		◎		◎		◎		◎
	PLAY B・T TORQUE		◎		◎		◎		◎		◎

Note : The back tension torque is the value that has been measured by the cassette torque meter (VHT-063S). The torque of FF, REV, REW, and PLAY represent those measured with them locked by the torque guage. FF and REW are values 2 seconds after starting.

Torque value :
FWD : 600 gcm or more
REW : 600 gcm or more
PLAY (2H) : 100 to 160 gcm
REV : 210 to 280 gcm
Back tension : 52 ± 13 gcm

(2) CLEANING

1. Drum (COMPL CYLINDER) and Video Heads (See Fig. 7-6-1.)

1) Wrap a chamois leather around your finger and moisten it with methyl alcohol.
2) Move the chamois leather to left and right several times on the video head to clean. There is a video head also on the opposite side, so clean it likewise. In this models, clean the audio head also.
3) Clean the tape path surface of the cylinder in the same way.

Note: Always turn power off before cleaning. Never move the chamois leather vertically or apply too much force to the head ; it may be damaged.

2. Cleaning of the Tape Guide System (See Fig. 7-6-2.)

Set the EJECT mode and clean the tape guide system (tape guides, impedance roller, FTE head, ACE head, pinch rollers, capstan axles, etc.) with a chamois leather moistened with methyl alcohol.

Note: Make sure that no oil, grease, etc. adhere to the chamois leather and that heads are not damaged.

3. Cleaning of the Drive System

Clean the drive system (loading belt, reel drive belt, pulley, supply reel table, etc.) with a soft cloth moistened with methyl alcohol.

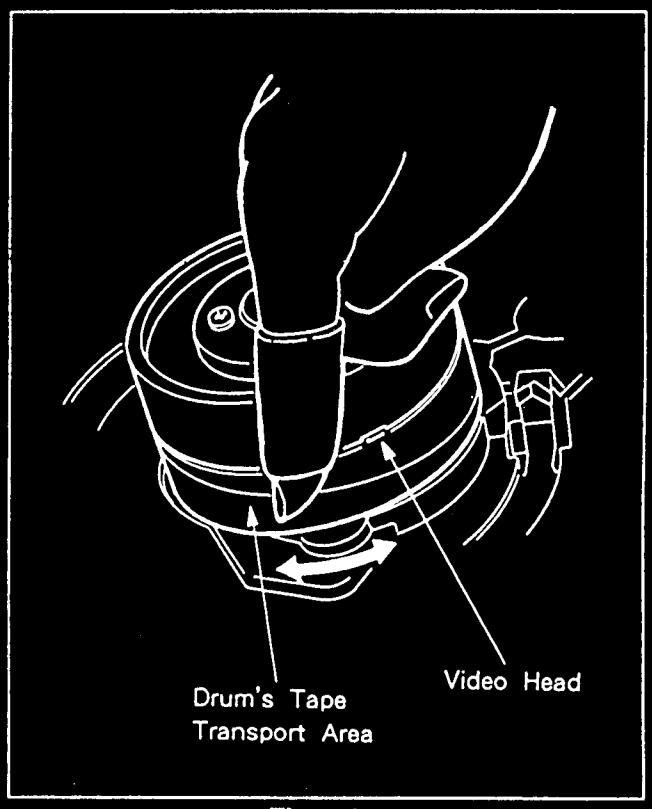


Fig. 7-6-1.

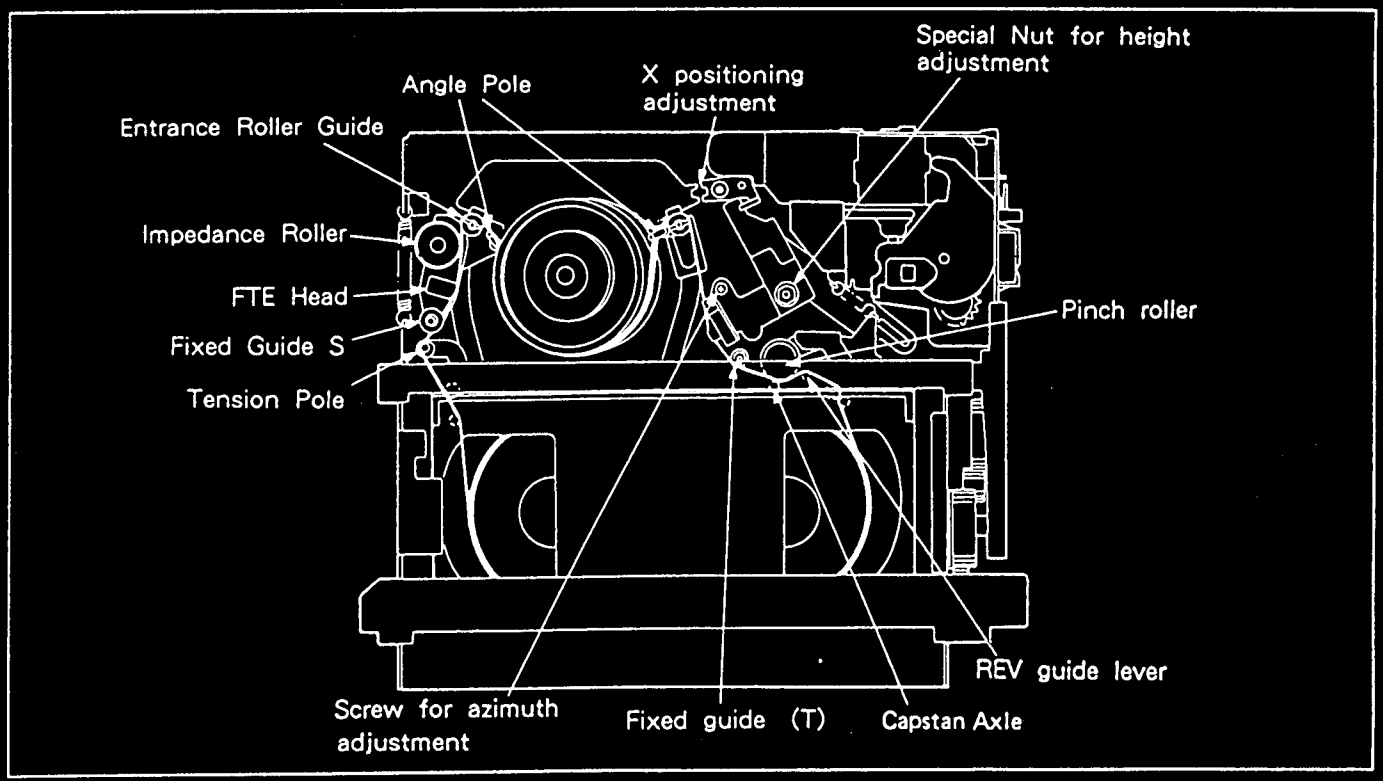


Fig. 7-6-2. Cleaning

7-6-2.Mode Selector (VHJ-0050) Handling Instructions

The mode selector drives the loading motor of the P91 mechanism with its internal batteries (UM-2 × 4 = 6V), using LEDS to indicate the mode (EJECT, INITIAL, BRAKE, STOP/REW/FWD, STILL, PLAY, IDLER, REV) simultaneously with EJECT⇔REV mode changes.
Instead of the internal batteries, an external DC 6V power supply can also be used.

(1) PART NAMES (See Fig. 7-6-3.)

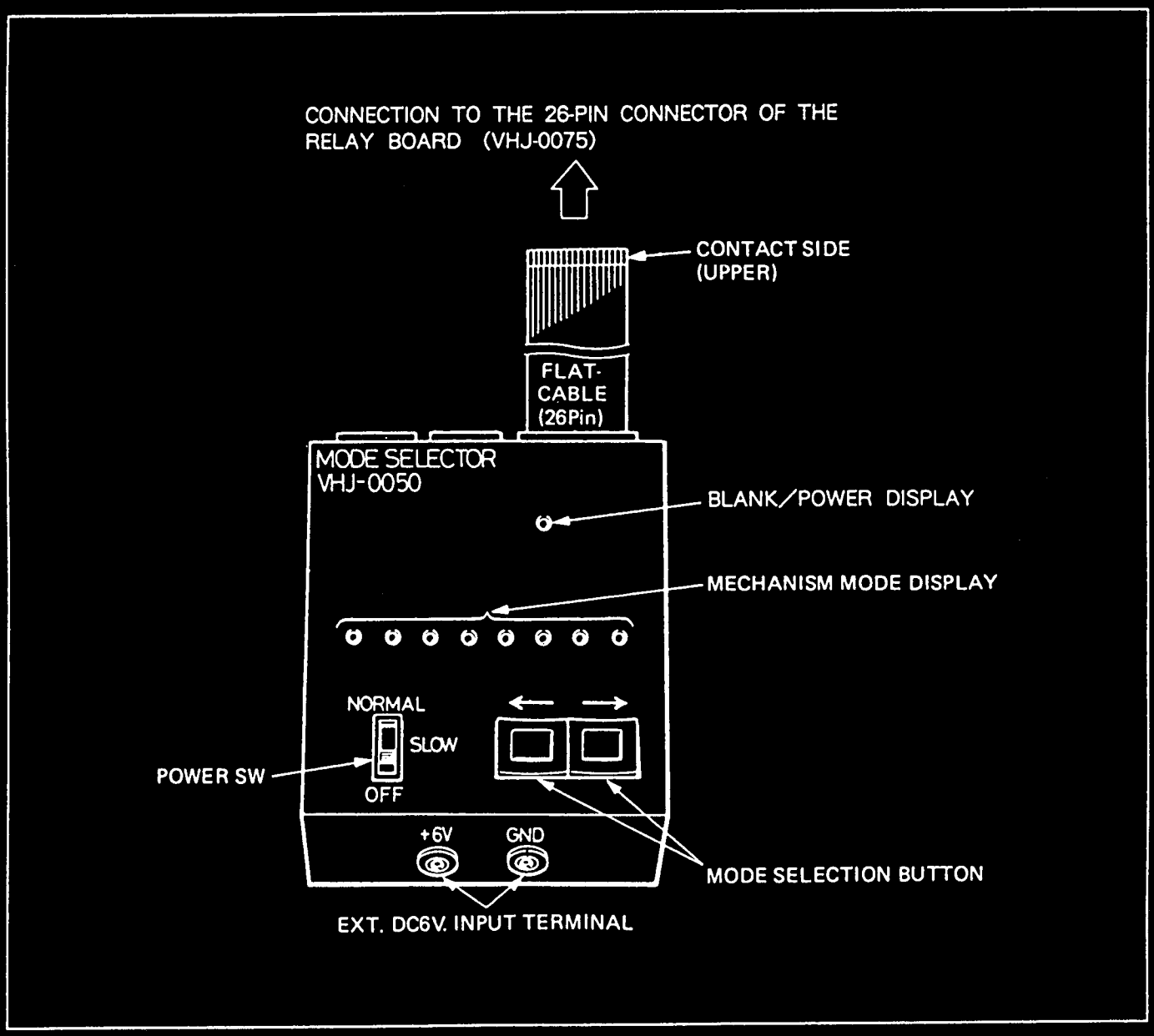


Fig. 7-6-3.

(2) CONNECTION METHOD

1. Connection for model VH-90
(See Fig. 7-6-4.)

1) Remove the 7-wire cable connected from the system control circuit to the connector (CN822) of the MC-3 board.
2) Connect the 7-wire cable (VHJ-0076) between the connector (CN822) of the MC-3 board and the 7-pin connector of the Mode Selector Connection Board (VHJ-0075).
3) Remove the 6-wire cable extending from the cassette holder section from the connector of the System Control Circuit Board and connect it to the 6-pin connector of the Mode Selector Connection Board (VHJ-0075).
4) Connect a supplied 26-pin flat cable (VHJ-0064) of the mode selector (VHJ-0050) between the mode selector body and the 26-pin connector of the Connection Board (VHJ-0075).

Note: Care should be taken to avoid mistaking the direction of the contacting side when connecting a flexible flat cable.

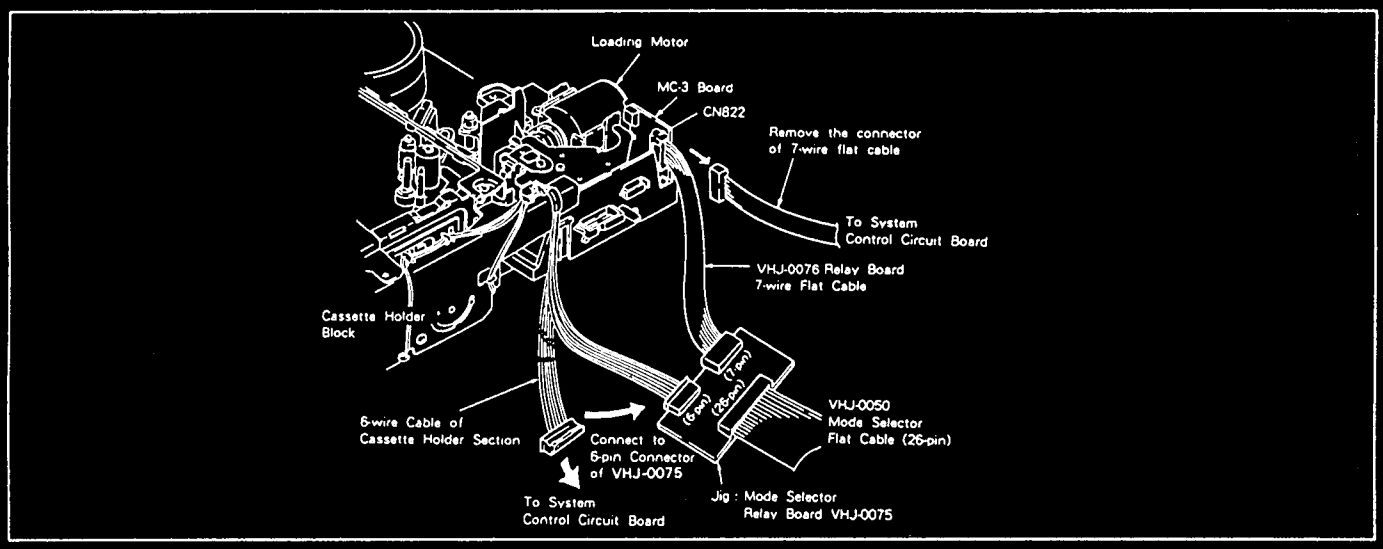


Fig. 7-6-4. Connection

(3) HANDLING METHOD

1) The mode changes in sequence of EJECT, INITIAL, BRAKE, STOP/REW/FF, STILL, PLAY, IDLER, REV when the right side (⇨) of the mode selector button is kept on pressing.
2) To change the mode from REV to EJECT, press the left side (⇦) of the mode selector button to select the desired mode.
3) In the mid position of each mode during a shift to other mode, the "BLANK" LED lights. But the "PLAY", "IDLER", "REV" LEDs light between the EJECT mode and the INITIAL mode. Be sure therefore to check the mechanism body to see just what state the mechanism is in.
   Incidentally, if the mode selector is not connected to the mechanism, the "BLANK" LED lights to indicate the power ON.
4) The SLOW position of POWER switch makes relatively slow motions in comparison with the NORMAL position.

Note 1: The mode selector drives the loading motor only, not affecting the head drum motor and the capstan motor. When using the mode selector with a cassette loaded, turn the capstan motor manually to remove tape slackness, preventing tape entanglement.

Note 2: If the Left side (⇦) of the mode selector (VHJ-0050) key is kept pressed with the COMPL cassette mechanism removed, it might get past the EJECT position, causing the front helical gear and the front worm gear to get disengaged.

In this condition, since the front helical gear will not turn even if the right side (⇨) of the mode selector key is pressed, rotate (push) the front helical gear clockwise by hand and engage it with the front worm gear. As there is a misalignment between the mechanism main body operation mode (indicated by the mode selector indicator lamps) and the front loading mechanism operation mode, keep the right side (⇨) of the mode selector key pressed until the front helical gear and the front loading gear of the front loading mechanism get back to the initial condition. (See A and B in Fig. 7-7-9. of page 109. Loading Motor.)

When the front loading mechanism returns to the initial condition, operation mode of the whole mechanism gets back to normal, matching the mode shown by the mode indicator lamps (mode EJECT would not be properly indicated during eject).

Sometimes, engagement of the front helical gear with the front worm gear is delayed and operation mode. The mechanism main body gets too much ahead and the front loading mechanism mode cannot be switched to the initial condition. In that case, press the Left side (⇦) of the mode selector key, setting the mechanism main body operation mode back to EJECT (rotation of the mode cam and the MAIN CAM stops).

Note 3: The mode indicator lamps show the mechanism operation mode, but the EJECT lamp may sometimes fail to indicate the actual mechanism operation mode.

When setting the mechanism to the EJECT or INITIAL mode for dismounting or reassembling, fine adjustment of the each gear and cam, etc., marking positions is required after the mode indicator lamp has lighted up. Perform this with the mode selector switch in the SLOW position.

7-7. MECHANISM DISMANTLING AND REASSEMBLING

7-7-1.Mechanism Main Unit (See Fig. 7-7-1.)

1. Removal
1) Remove the connectors of the COMPL MC-3 and the COMPL HEAD BRACKET.
2) Remove the flexible cable ① connecting the COMPL CYLINDER to the PRE-AMP UNIT ③. (See Fig. A.)
3) Remove the two screws ②, then remove the PRE-AMP UNIT ③.
4) Remove the two screws ④, then remove the PRE-AMP BRACKET ⑤.
5) Remove the two screws ⑥.
6) Remove the three screws ⑦ and two screws ⑩, then lift up the mechanism main unit and remove it.
Since the TRAY ⑧ obstructs removal of the two front screws ⑩, move the TRAY LOCK LEVER ⑨ in the direction of the arrow to unlock, then slide the TRAY ⑧ before removing the screws. (See Fig. B)

Note: Shape of the PRE-AMP UNIT ③ and the PRE-AMP BRACKET ⑤ differ depending on the model.

2. Remounting
1) Mount the mechanism main unit onto the chassis with the three screws ⑦ and two screws ⑩.
2) Tighten the two screws ⑥.
3) Mount the PRE-AMP BRACKET ⑤ with the two screws ④.
4) Mount the PRE-AMP UNIT ③ and the ground lug with the two screws ②. (some models are not provided with a ground lug.)
5) Insert the flexible cable ① into the connector of the PRE-AMP UNIT.
6) Connect the connectors of the COMPL MC-3 and COMPL HEAD BRACKET.

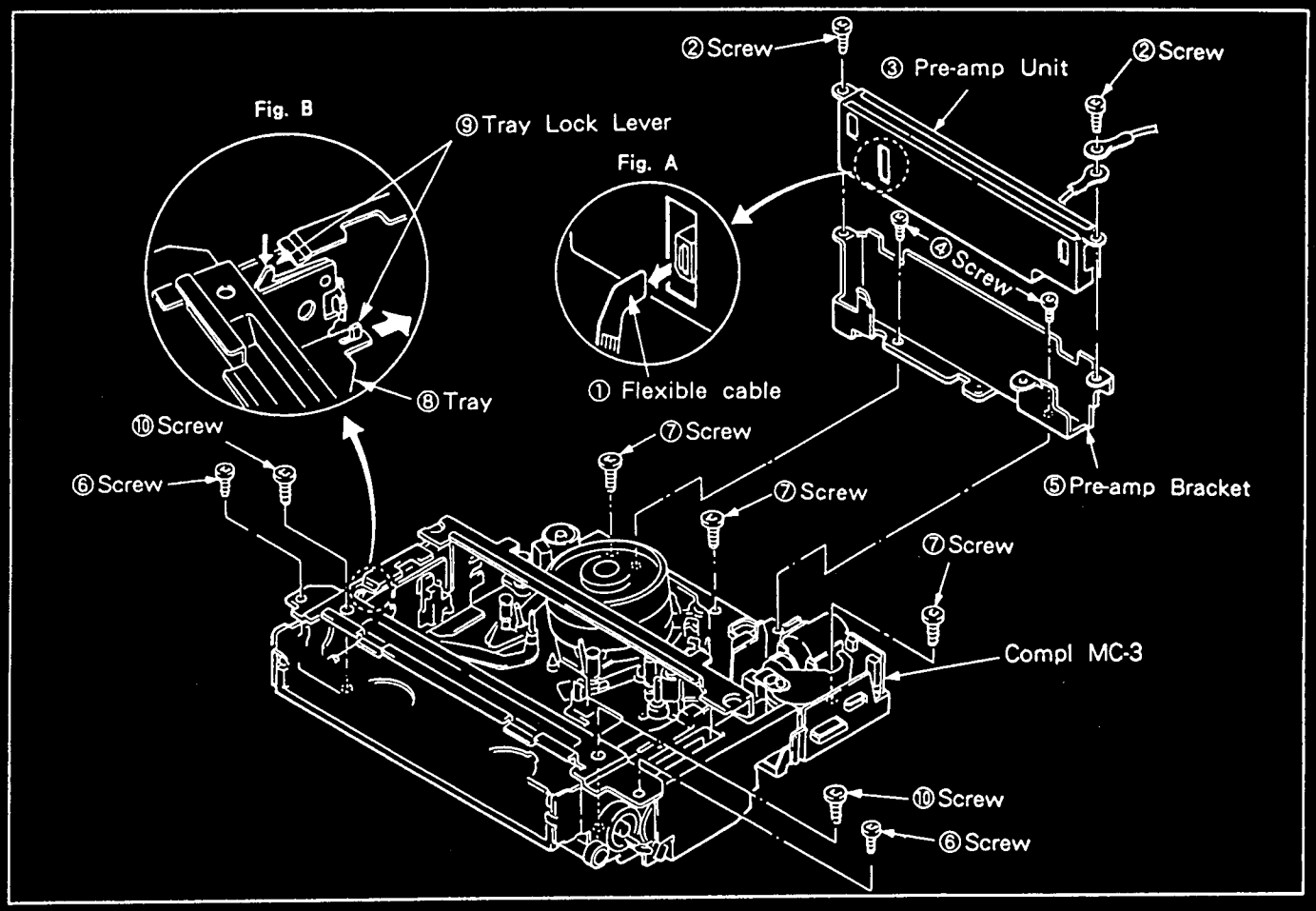


Fig. 7-7-1. Mechanism Main Unit

7-7-2.Cassette Mechanism Assembly

(1) COMPL CASSETTE MECHANISM
(See Fig. 7-7-2.)

1. Removal
1) Set the video main unit to the EJECT completed mode.
2) Pull out the connectors (6-PIN CONNECTOR connected to the system control circuit board, ACE HEAD CONNECTOR, and FTE HEAD CONNECTOR) from CASSETTE HOLDER.
3) Remove the two screws ①.
4) Remove the two screws ②.
5) Lift up the COMPL CASSETTE MECHANISM ④ back a little and remove the two hooks ③ on the front. (See Fig. B.) When doing so, make sure that the SAFETY SWITCH LEVER is not caught by the mechanism chassis.

2. Remounting
1) Set the chassis section mechanism to the EJECT mode with the mode selector (VHJ-0050) (looking from the top, align the EJECT mode positioning alignment hole ⑤ to the MOTOR HOLDER hole ⑥ as shown in Fig. A).
2) Set the COMPL CASSETTE MECHANISM ④ to the EJECT completed mode.
3) Mount the COMPL CASSETTE MECHANISM ④ onto the mechanism chassis, aligning it with the protuberance.
Align the EJECT mode positioning alignment mark ⑧ to the △ positioning alignment mark ⑦. (See Fig. A)
4) Fix to the mechanism chassis with the two screws ②.
5) Fix to the chassis with the two screws ①.
6) Connect to the various connectors.

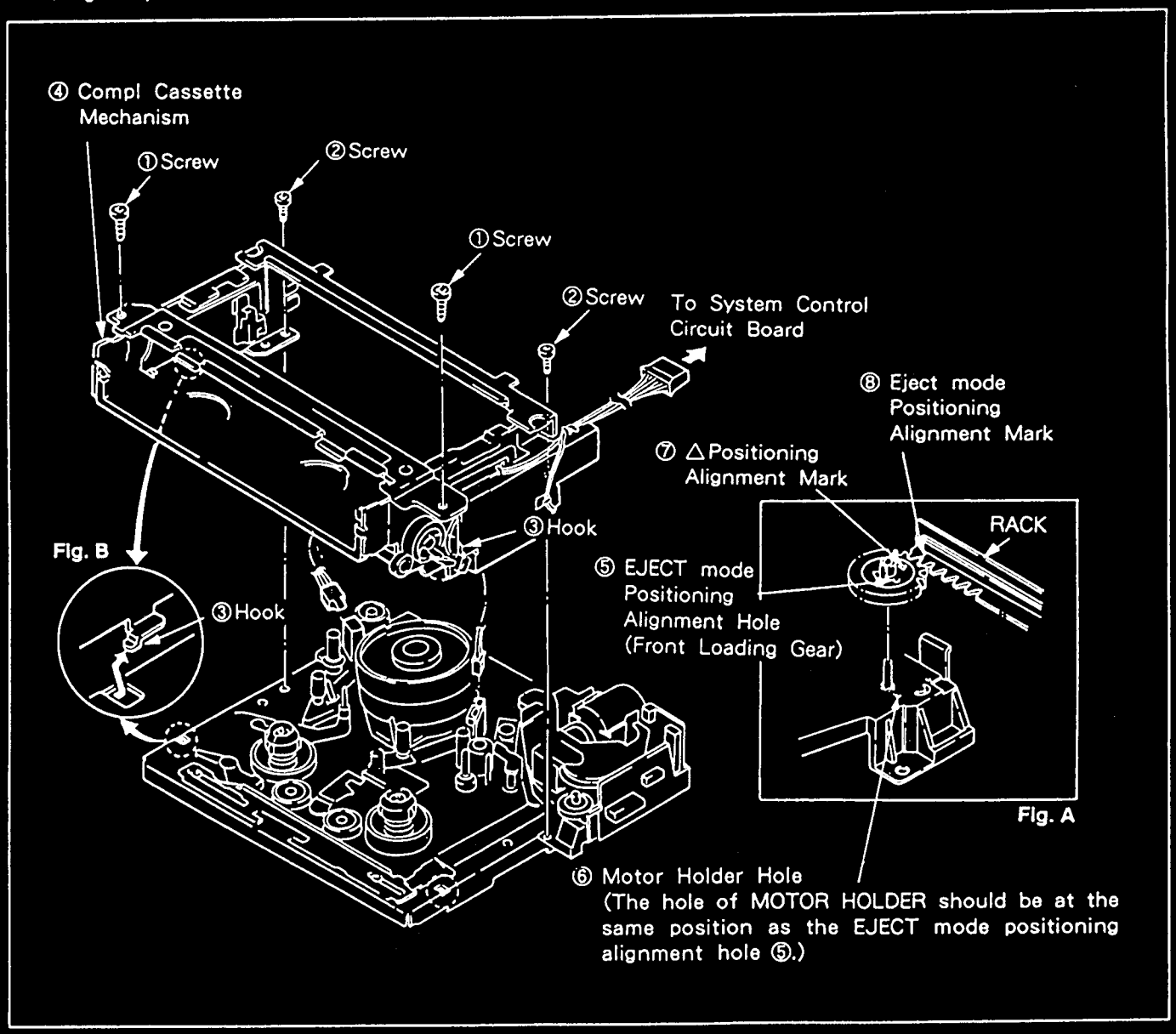


Fig. 7-7-2. COMPL Cassette Mechanism

(2) GEAR BRACKET ASS'Y (See Fig. 7-7-3.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 7-7-2.
2) Remove the four screws ①, then remove the GEAR BRACKET ASS'Y ② as shown in Fig. A.
3) Remove the E ring ③, then remove the LOCK GEAR ④, the PINION LEVER ASS'Y ⑤, the PINION GEAR ⑥ and the RACK ⑦, in that order.

2. Remounting

1) Apply grease to the shaft ⑧ and the two pins ⑨ of the GEAR BRACKET ASS'Y.
2) Apply grease to the pin ⑩ of the PINION LEVER ASS'Y.
3) Apply grease to the toothed part of the RACK ⑦.
4) Fit the RACK ⑦ onto the two pins ⑨. Align the positioning alignment hole ⑪ to the positioning alignment hole ⑫ of the GEAR BRACKET.
5) Mount the PINION GEAR ⑥, PINION LEVER ASS'Y ⑤, and LOCK GEAR ④ in the shaft ⑧ in the order mentioned.
   Align the positioning alignment holes ⑬ of PINION GEAR and LOCK GEAR with the positioning alignment hole ⑪ of RACK at that time.
6) Mount the E ring ③ onto the shaft ⑧.
7) Set the GEAR BRACKET ASS'Y ② to the dowel and mount it using four screws ①.
   Align the positioning alignment hole Ⓐ of the IDLER GEAR with the positioning alignment hole Ⓑ of the SIDE BOARD as shown in Fig. 5-7-4. at this time.
   Also align the positioning alignment holes ⑬ of PINION GEAR and LOCK GEAR with the positioning alignment hole ⑫ of GEAR BRACKET by referring to Fig. 7-7-3. After mounting them, check to be sure that FL START SWITCH ⑭ is in the ON state shown in Fig. A.
8) Remount the COMPL CASSETTE MECHANISM as instructed in P.101.

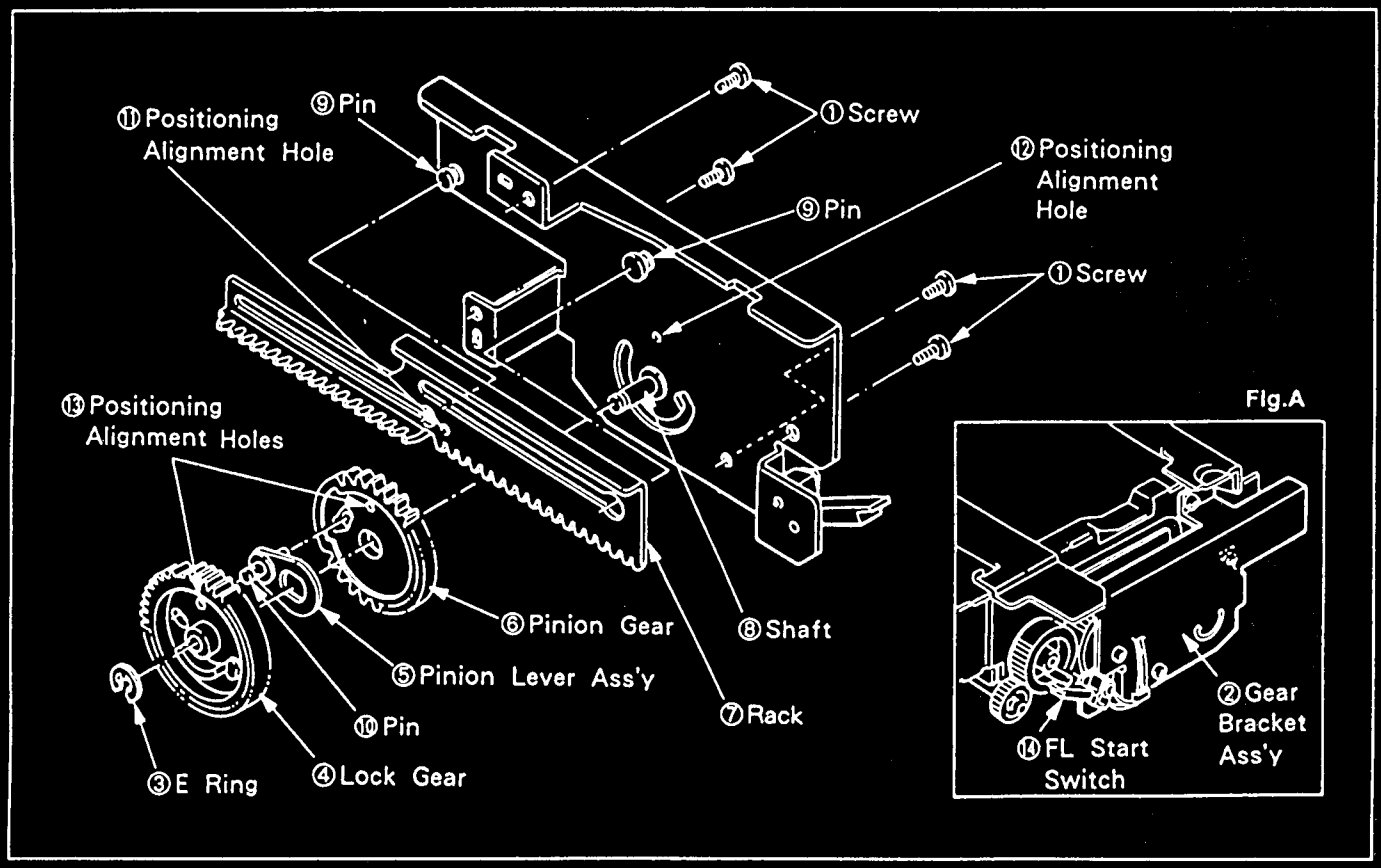


Fig. 7-7-3. Gear Bracket Ass'y

(3) CASSETTE DRIVE GEAR (RIGHT)
(See Fig. 7-7-4.)

1. Removal
1) Remove the COMPL CASSETTE MECHANISM and the GEAR BRACKET ASS'Y as instructed in P.102. and P.103., respectively.
2) Remove the IDLER GEAR ①.
3) Remove the SPRING COIL ②, then remove the MAIN GEAR ③.
4) Remove the E ring ④, then remove the LEVER GEAR ASS'Y R ⑤.

2. Remounting
1) Apply grease to gear parts that undergo friction.
2) Align the positioning alignment hole Ⓐ of IDLER GEAR ⑧ with the positioning alignment hole Ⓑ of SIDE BOARD.
3) Mount the LEVER GEAR ASS'Y R ⑤ onto the axles ⑪ and ⑫. Align with the IDLER GEAR ⑧ as shown in Fig. A.
4) Mount the E ring ④ onto the axle ⑫.
5) Mount the MAIN GEAR ③ onto the axle ⑪. When doing so, align with the IDLER GEAR ⑧ as shown in Fig. A.
6) Hook the SPRING COIL ② to the notch ⑬ in the MAIN GEAR ③ and the LEVER GEAR ASS'Y R.
7) Mount the IDLER GEAR ① onto the axle ⑭. When doing so, align with the MAIN GEAR as shown in Fig. A.
8) Mount the GEAR BRACKET ASS'Y and the COMPL CASSETTE MECHANISM as instructed in P.103. and P.102., respectively.

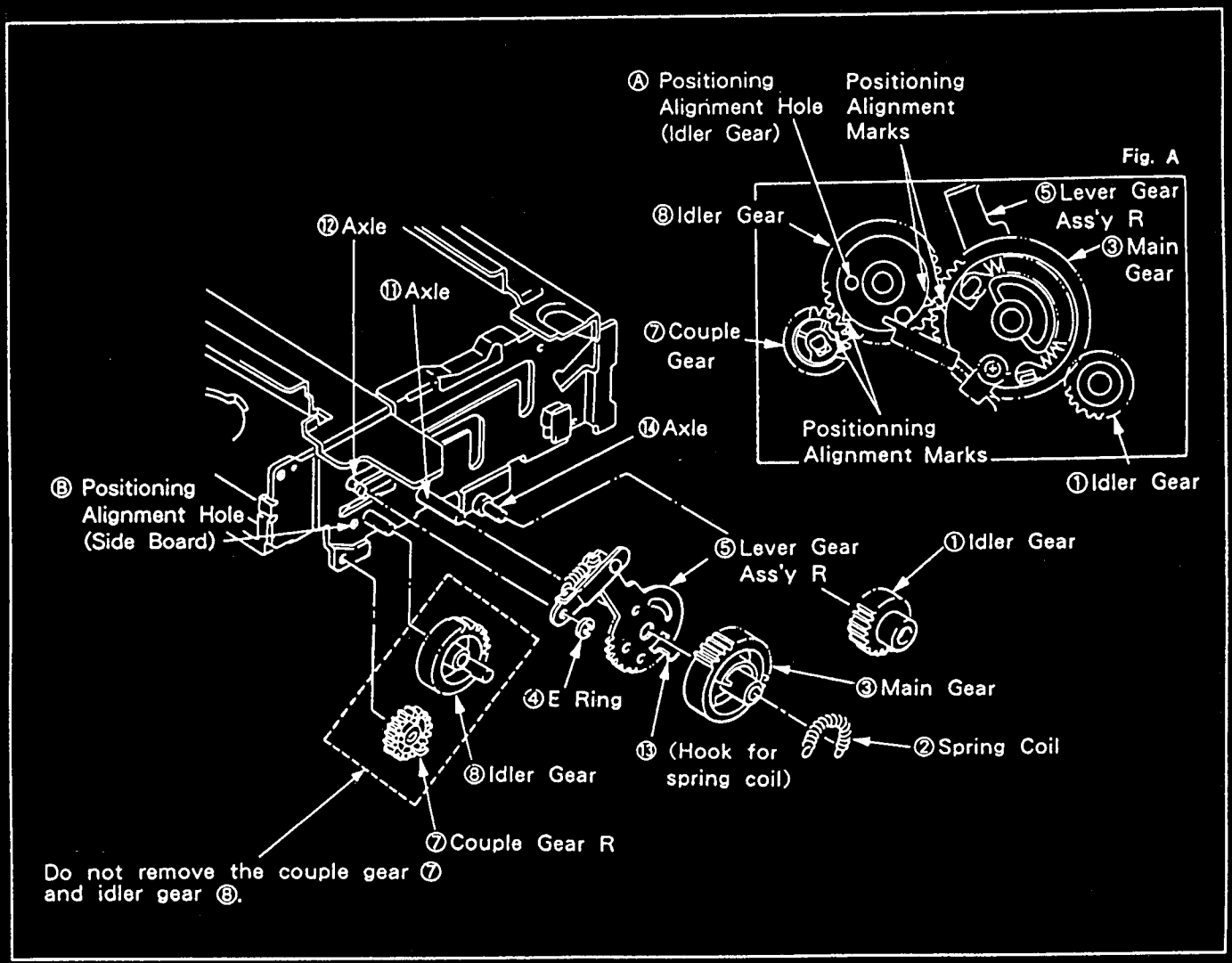


Fig. 7-7-4. Cassette Drive Gears(Right Side)

(4) CASSETTE DRIVE GEAR (LEFT)
(See Fig. 7-7-5.)

1. Removal
1) Remove the COMPL CASSETTE MECHANISM as instructed in P.101.
2) Remove the E ring ②.
3) Open the hook ③, then remove the LEVER GEAR ASS'Y L ④. Take care not to open the hook ③ too much, otherwise it may get deformed or broken. If it does, replace it.
4) Remove the SPRING COIL ⑤ from the LEVER GEAR ASS'Y L ④.

2. Remounting
1) Apply grease to the axle ⑨ and shaft ⑩.
2) Align with the COUPLE GEAR L ⑬ and the IDLER GEAR L ⑥ as shown in Fig B.
3) Hook the SPRING COIL ⑤ to the LEVER GEAR ASS'Y L ④.
4) Mount the LEVER GEAR ASS'Y L ④ onto the axle ⑨ and the shaft ⑩. Align with the IDLER GEAR L ⑥ as shown in Fig. B.
5) Mount the COMPL CASSETTE MECHANISM onto the chassis as instructed in P.101.

Note: The end of the DOOR OPEN LEVER ⑦ leans against the front side of the CASSETTE DOOR ⑪ as shown in Fig. A.

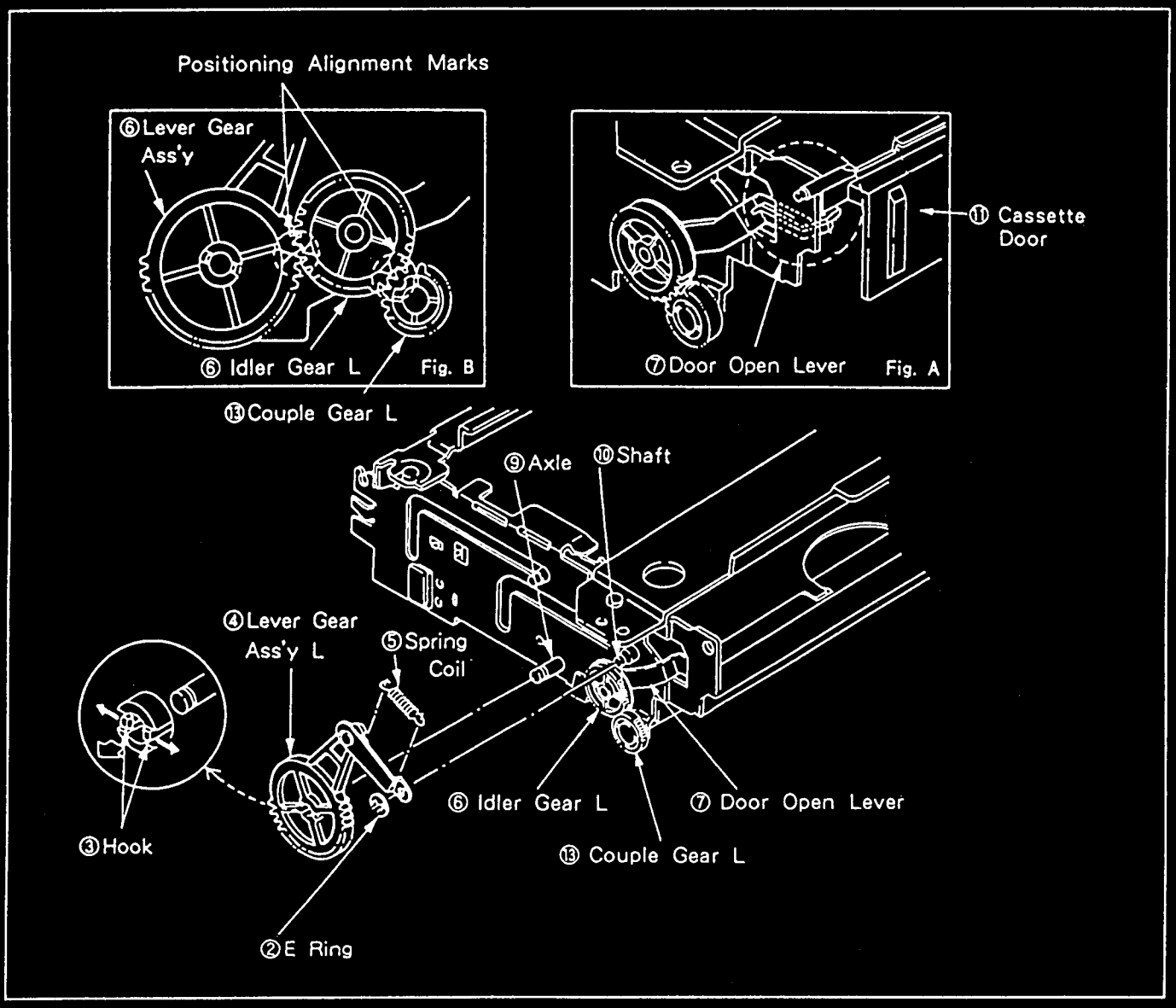


Fig. 7-7-5. Cassette Drive Gears(Left Side)

(5) FL START SWITCH (See Fig. 7-7-6.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in P.101.
2) Remove the screw ①.
3) Remove the lead wire of the FL START SWITCH ②.

2. Remounting

1) Solder the lead wire to the FL START SWITCH ② terminal.
2) Align the FL START SWITCH ② protuberance to the hole ⑤, then mount it onto the GEAR BRACKET ASS'Y ③ with the screw ①. Do it so that the FL START SWITCH ② is turned ON by holding the pin ④ of IDLER GEAR in the EJECT completed mode.
3) Mount the COMPL CASSETTE MECHANISM as instructed in P.101.

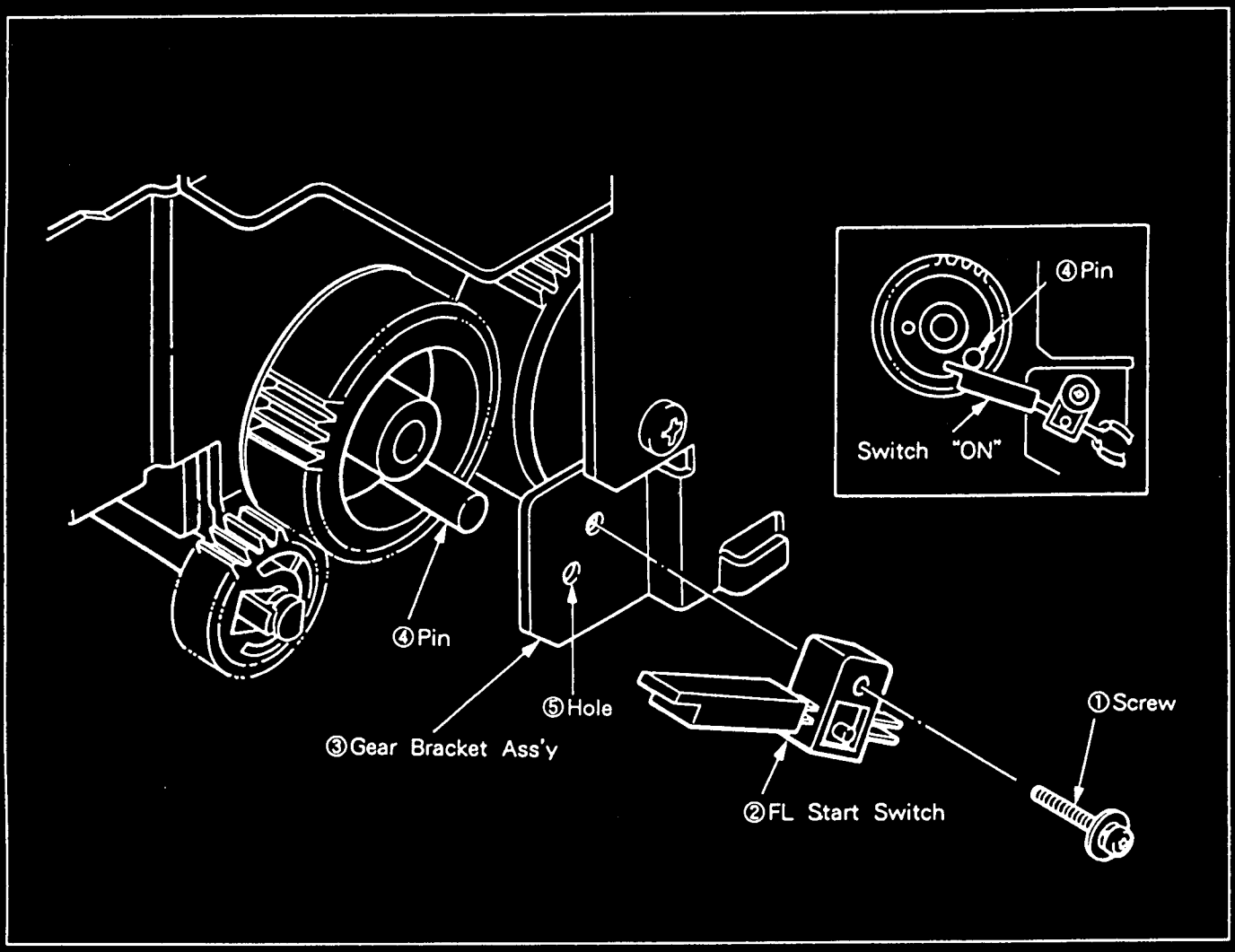


Fig. 7-7-6. FL Start Switch

(6) T-TOP SENSOR, T-END SENSOR
(See Fig. 7-7-7.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in P.101.
2) When removing the T-TOP SENSOR, remove the GEAR BRACKET ASS'Y as instructed in P.88.
3) Unhook the hook ① as instructed in Fig. A, then remove the LID ②. Take care not to push the hook ① too much, otherwise it may be deformed or broken.
4) Remove the photo transistors ③, then remove the lead wires.

Note: Mounting position of the transistor holder on the T-END SENSOR side is precisely adjusted at the factory, so never remove it from the COMPL CASSETTE MECHANISM.

2. Remounting

1) Solder the brown lead wire to the emitter side, and the red lead wire to the collector side of the T-TOP SENSOR photo transistor ③.
Solder the orange lead wire to the emitter side, and the yellow lead wire to the collector side of the T-END SENSOR photo transistor.
2) Mount the photo transistors ③ onto their respective holders.
3) Mount the LID ② and fix it with the hook ①.
4) Mount the GEAR BRACKET ASS'Y as instructed in P.102.
5) Mount the COMPL CASSETTE MECHANISM as instructed in P.101.

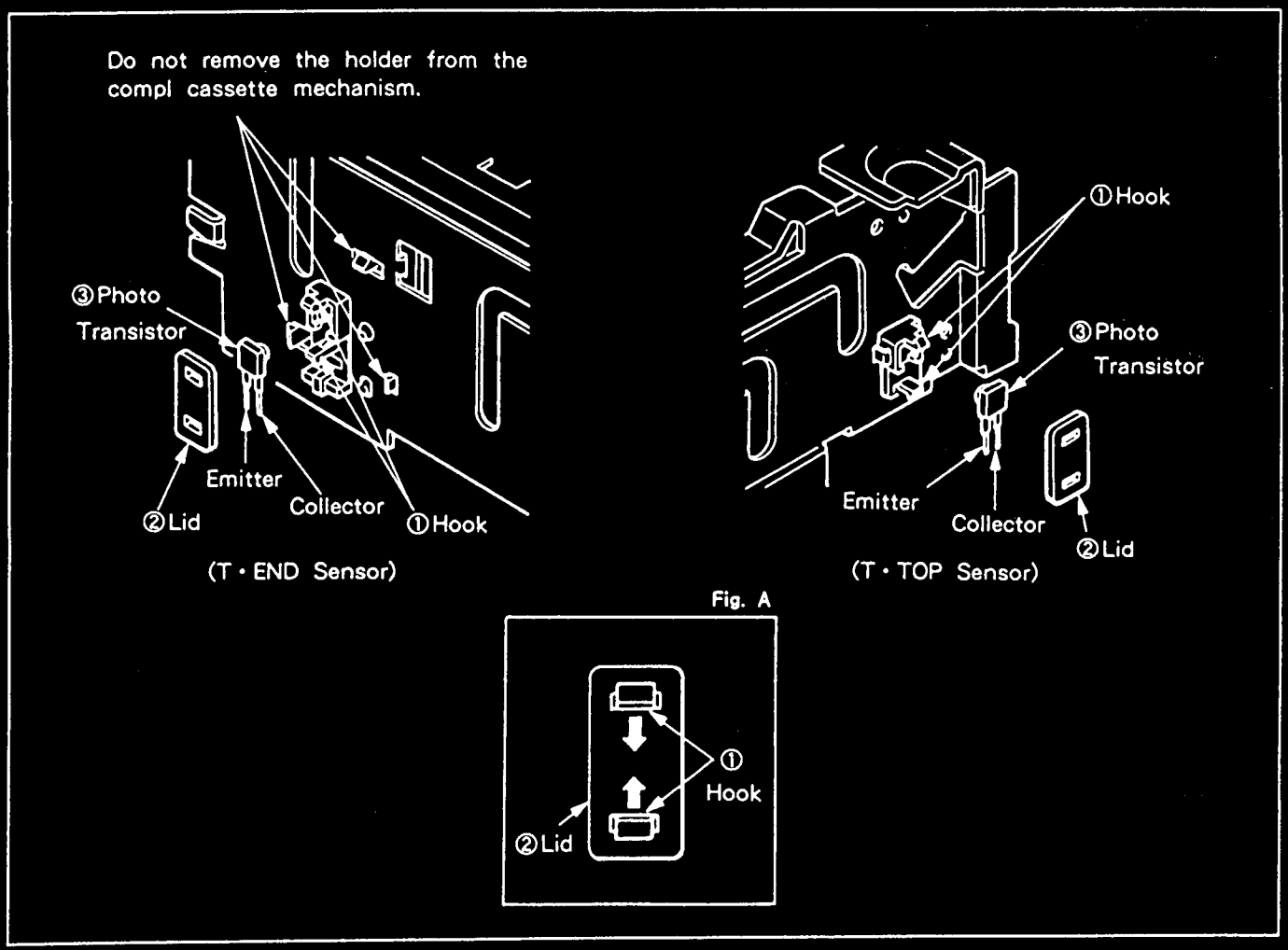


Fig. 7-7-7. T TOP Sensor & T END Sensor

7-7-3.COMPL Holder Motor (Loading Motor Block)

(1) COMPL Motor Bracket

1. Removal

1) Remove the PRE-AMP UNIT and the PRE-AMP. BRACKET as instructed in 7-7-1.
2) Remove the COMPL CASSETTE MECHANISM as instructed in P.101.
3) Remove the two screws ① and the other one ⑩, then remove the COMPL HOLDER MOTOR ② (See Fig. 7-7-8.)

2. Remounting

1) Set the mechanism chassis to the INITIAL mode. In this mode, look at the mechanism chassis INITIAL mode positioning alignment holes ③ just from above and align the MAIN CAM ④ and MODE CAM ⑤ INITIAL mode positioning alignment holes as shown in Fig. A.
2) Set the COMPL HOLDER MOTOR ② to the INITIAIL mode with the mode selector (VHJ-0050). In this position, the FRONT LOADING GEAR △ positioning alignment mark ⑥ is aligned with the MOTOR HOLDER INITAL mode positioning alignment mark ⑦ (see Fig. B.).
3) Align the ROTARY SWITCH (mode detector switch) ⑧ with the INITIAL mode positioning alignment mark ⑨ (see Fig. C.).
4) Line up COMPL HOLDER MOTOR ② with PROTUBERANCE ⑪ and POSITIONING ALIGNMENT HOLE ⑫, and attach with two screws ① and one screw. (See to Fig. 7-7-8.)
5) Mount the COMPL CASSETTE MECHANISM as instructed in P.101.
6) Mount the PRE-AMP UNIT and the PRE-AMP. BRACKET as instructed in 7-7-1.

Note: Normal mechanism operation cannot be achieved if initial positioning of the MAIN CAM ④, the MODE CAM ⑤ and the ROTARY SWITCH (mode detector switch) ⑧ are not performed precisely.

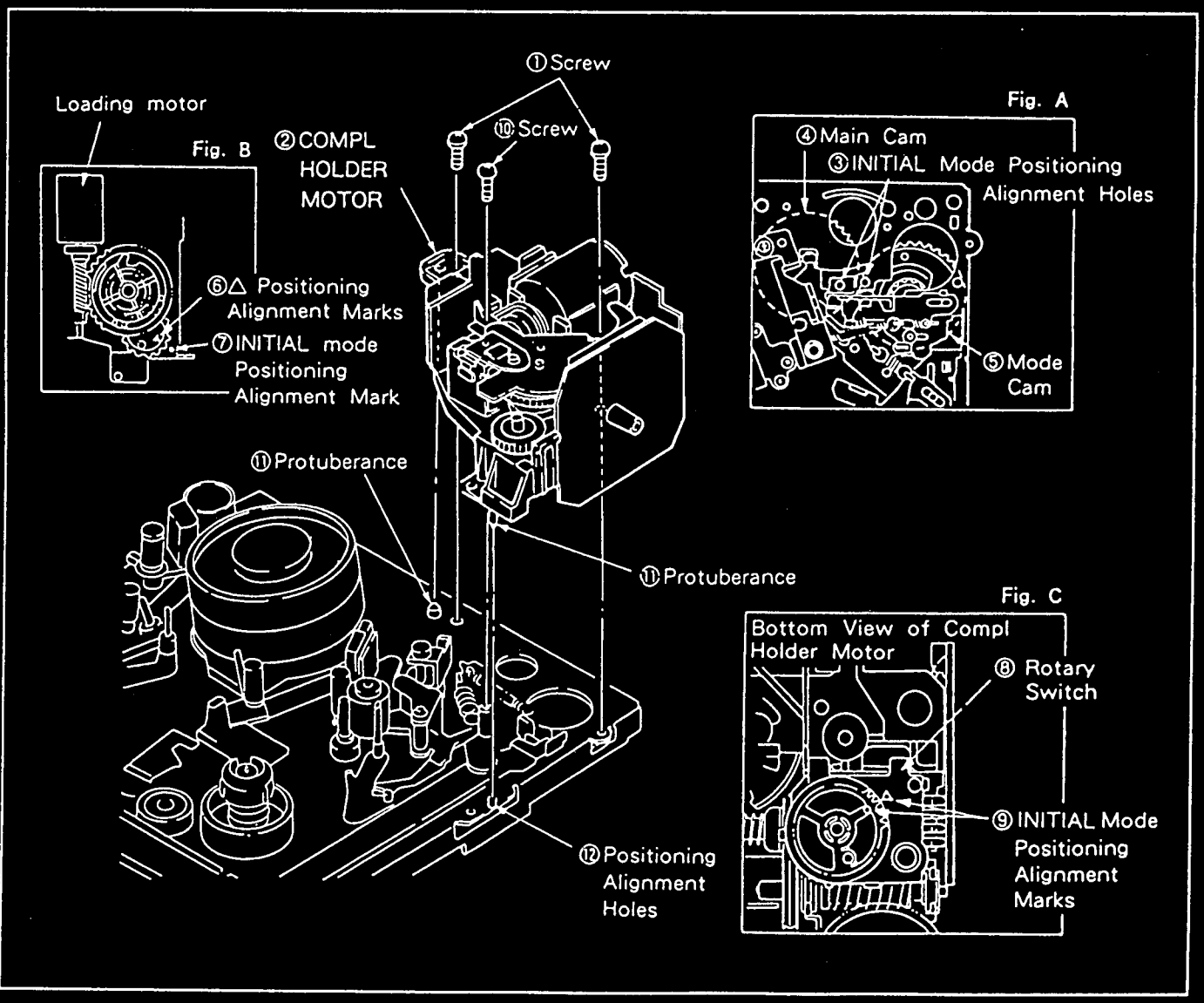


Fig. 7-7-8. Compl Holder Motor

(2) LOADING MOTOR (See to Fig. 7-7-9)

1. Removal

LOADING MOTOR can be replaced after LOADING MOTOR BLOCK unit has been removed by referring to 7-7-8. The 1991 version of the mechanism allows LOADING MOTOR itself to be replaced without removing CASSETTE HOLDER BLOCK and LOADING MOTOR BLOCK. The following describes this procedure.

1) Use MODE SELECTOR (VHJ-0050) to set the mechanism to the INITIAL mode.
2) Remove the connector for DEW SENSOR connected to the MC-3 board ①.
3) Remove the three screws ② and remove the HOLDER BRACKET ④ with the FRONT WORM ASS'Y ③ still attached.
4) Remove the DAMPER ⑥ attached to the pulley of the LOADING MOTOR ⑤.
5) Remove the FRONT HELICAL GEAR ⑦ and WASHER ⑧.
6) Remove soldered LEAD WIRE from the terminal of LOADING MOTOR ⑤.
7) Remove the LOADING BELT ⑨.
8) Remove the LOADING MOTOR ⑤ by lifting up from the back terminal side.

2. Remounting

Before attaching the LOADING MOTOR ⑤ to the MOTOR HOLDER ⑩, confirm the DAMPER ⑪ and DAMPER ⑫ shown in Fig. 7-7-9. are in the proper position on MOTOR HOLDER ⑩.

1) The LOADING MOTOR ⑤ puts PROTUBERANCE ㉓ in the slit ㉔ of the MOTOR HOLDER ⑩. Further, mount the tap hole ⑬ at two points of the front pulley side so that the it is secured to the PROTUBERANCE ⑭ of the MOTOR HOLDER at two points.
2) Solder the lead wire from the MC-3 board to the LOADING MOTOR ⑤ terminal. (Solder the red lead wire to the positive terminal side.)
3) Hang the LOADING BELT ⑨ on the pulley.
4) After hanging the LOADING BELT ⑨ on the pulley, confirm that the mechanism unit is in the INITIAL mode. The initial mode is indicated by Fig. A of Fig. 7-7-9. and is the position in which INITIAL mode positioning alignment holes of the MAIN CAM ⑮ and MODE CAM ⑯ are lined up with the THROUGH HOLE ⑰ of the MOTOR HOLDER. If the INITIAL mode is not selected, adjust with MODE SELECTOR (VHJ-0050).
5) As shown in Fig. B, confirm the positions of the △ INITIAL positioning alignment mark on the FRONT LOAD GEAR ⑱ and INITIAL mode positioning alignment mark ⑲ position of the MOTOR HOLDER and the position relationship of the RACK ⑳.
6) Apply a light coat of grease to the entire sides of the AXLE ㉑ and FRONT HELICAL GEAR ⑦.
7) Attach the FRONT HELICAL GEAR ⑦ and WASHER ⑧ to the AXLE ㉑. As shown in Fig. C, the FRONT HELICAL GEAR ⑦ is attached so that the indent on the side is inside PIN ㉒ of the FRONT LEVER ASS'Y.
8) Attach the DAMPER ⑥ to the LOADING MOTOR ⑤ pulley.
9) The HOLDER BRACKET ④ is attached by engaging the FRONT WORM ASS'Y ③ with the LOADING MOTOR ⑤ pulley, and held in place with three screws ②.
10) Attach the connector of DEW SENSOR ㉕ to the MC-3 board ① and return the mechanism to the eject completion using MODE SELECTOR.

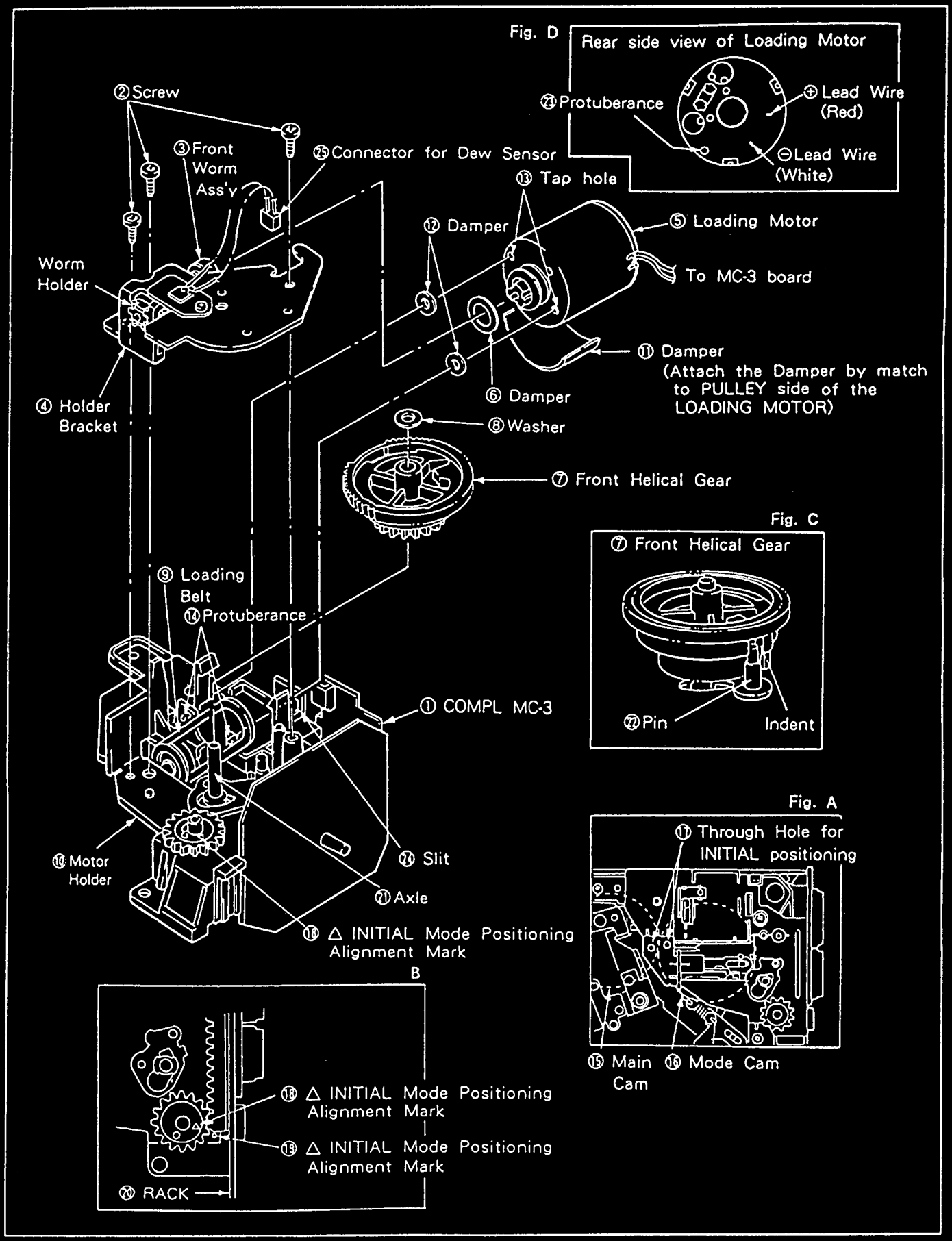


Fig. 7-7-9. Loading Motor

7-7-4. Tape Loading Mechanism

(1) MAIN PARTS OF THE TAPE LOADING MECHANISM (See Fig. 7-7-10)

1. Removal

1) Remove connectors from the DRUM MOTOR board (SV-5).
2) Remove the three screws ①, then remove the REINFORCE BRACKET ②.
3) Remove the two special washers ③, then remove the LOAD RACK ④.
4) Remove the special washer ⑤, then remove the CAM LOAD LEVER ASS'Y ⑥.
5) Remove the special washer ⑦, then remove the MAIN CAM ⑧.
6) Unhook the LOAD GEAR T hook ⑩, then remove the LOAD GEAR T ⑨ as shown in Fig. A, with the SPRING COIL ⑪ and the LOAD LEVER ASS'Y T ⑫ attached to it.
7) Unhook the LOAD GEAR S hook ⑭, then remove the LOAD GEAR S ⑬ as shown in Fig. B, with the SPRING COIL ⑮ and the LOAD LEVER ASS' Y S ⑯ attached to it.

Note: Take care not to open the LOAD GEAR hooks too much, otherwise they may be deformed or broken. If they are, replace them.

2. Remounting

1) Apply grease to the hole ⑰ of the LOAD LEVER ASS'Y S ⑯, as shown in Fig. B.
2) Apply grease to the hole ㉒ of the LOAD LEVER ASS'Y T ⑫ as shown in Fig. A, and to the sections of the LOAD GEAR T ⑨ as indicated with an arrow in Fig. C.
3) Apply grease to GROOVE 1, GROOVE 2 and to the outer side of the MAIN CAM ⑧, shown in Fig. E.
4) Apply grease to the three oval holes of the LOAD RACK ④ as shown in Fig. D.
5) Apply grease to the outer surface of axles ⑲, ⑳, ㉖ and ㉘.
6) After assembling as shown in Fig. B, mount the LOAD GEAR S ⑬ onto the axle ⑲. Insert the ROLLER BASE S pin ⑱ into the hole ⑰ of the LOAD LEVER ASS'Y S.
7) After assembling as shown in Fig. A, mount the LOAD GEAR T ⑨ onto the axle ⑳. When doing so, align the INITIAL mode positioning alignment holes ㉑ of the LOAD GEAR S ⑬ and the LOAD GEAR T ⑨ to the INITIAL mode position. Insert the ROLLER BASE T pin ㉓ into the hole ㉒ of the LOAD LEVER ASS'Y T ⑫.
8) Mount the MAIN CAM ⑧ onto the axle ㉖. At that time, make sure that the INITIAL mode positioning alignment holes ㉕ of the MAIN CAM ⑧ and the MODE CAM ㉔ match the INITIAL mode positioning alignment holes ㉙ of the MECHANISM CHASSIS. Also check to be sure that the pin ㉗ of the CAM PINCH LEVER ASS'Y is put in the GROOVE 1 of the MAIN CAM as shown in Fig. E.
9) Mount the special washer ⑦ onto the axle ㉖.
10) Mount the CAM LOAD LEVER ASS'Y ⑥ onto the axle ㉘. Insert the pin ㉜ into the MAIN CAM GROOVE 2 as shown in Fig. E.
11) Mount the special washer ⑤ onto the axle ㉘.
12) Set the INITIAL mode positioning alignment marks ㉚ of the LOAD RACK ④ and the LOAD GEAR T ⑨ to the INITIAL mode position, and mount onto the two axles ㉛. Insert the CAM LOAD LEVER ASS'Y pin ㉝ into the hole ㉜.
13) Mount the two special washers ③ onto the two axles ㉛.
14) Mount the REINFORCE BRACKET ② with the three screws ①.
15) Insert the connector into the DRUM MOTOR board (SV-5).
16) Confirm that loading and unloading are performed smoothly.

Note: Be sure to perform INITIAL mode positioning of cams and gears precisely.

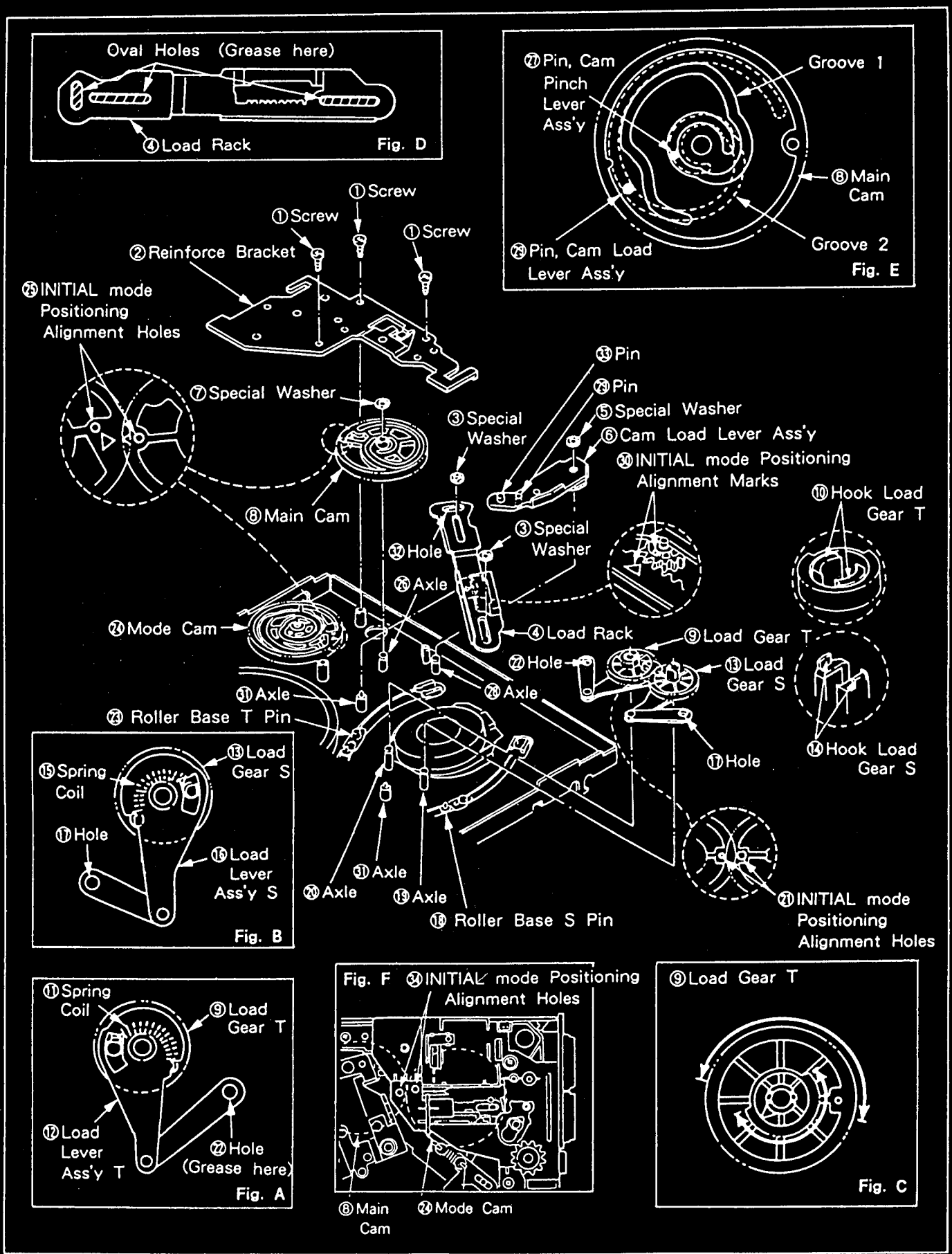


Fig. 7-7-10. Loading Mechanism Main Parts

(2) MODE CAM (See Fig. 7-7-11.)

1. Removal

1) Set the INITIAL mode with the mode selector (VHJ-0050).
2) Remove the REINFORCE BRACKET as instructed in P.110.
3) Remove the two special washers ①, then remove the CAM PLATE SLIDE ASS'Y ②.
4) Remove the MODE CAM ③.

2. Remounting

1) Seering P.110., confirm that the MAIN CAM is in the INITIAL mode position.
2) In case the MAIN CAM is misplaced, use the mode selector (VHJ-0050) to align the MAIN CAM positioning hole with the chassis INITIAL mode position hole (See P.110. for the INITIAL mode position). Since the ROTARY SWITCH (mode detector switch) does not rotate, the mode selector indicator lamp will not show the correct mode.
3) Align the ROTARY SWITCH (mode detector switch) ④ with the INITIAL mode positioning alignment mark ⑤ as shown in Fig. A.
4) Mount the MODE CAM ③ onto the axle ⑥. Do it so that the SLIDE CAM ASS'Y pin ⑪ is placed in the GROOVE 3 as shown in Fig. B.
5) Mount the CAM PLATE SLIDE ASS'Y ② onto the axles ⑥ and ⑦. Do it so that the pin ⑧ gets into the GROOVE 4 of the MODE CAM as shown in Fig. B, and the point of the bent-up part ⑨ into the ACT PLATE SLIDE ASS'Y hole ⑩.
6) Mount the two special washers ① onto the axles ⑥ and ⑦.
7) Mount the REINFORCE BRACKET as instructed in P.110.

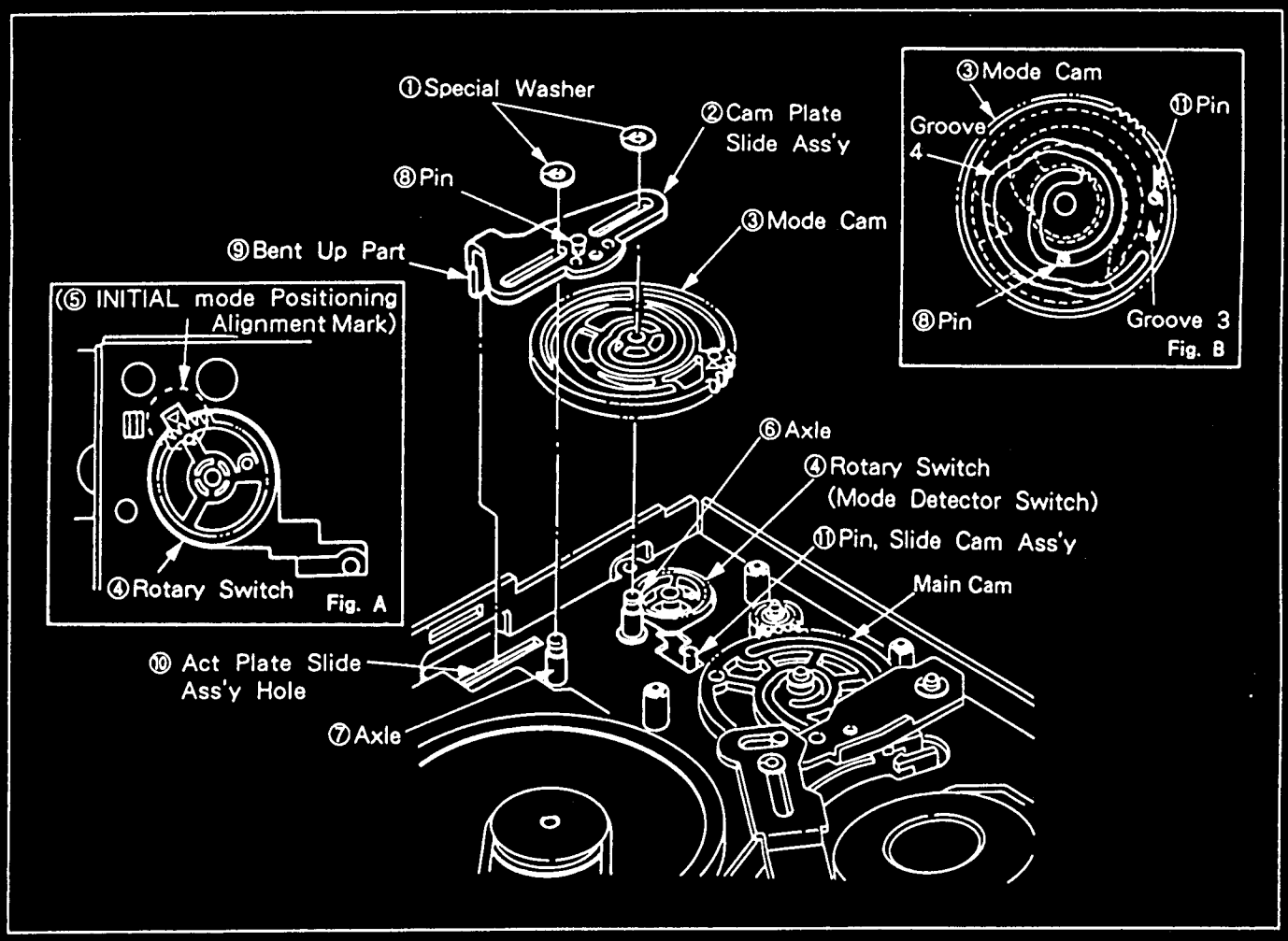


Fig. 7-7-11. Mode Cam

7-7-5.COMPL Head Bracket (ACE Head)(See Fig. 7-7-12.)

1. Removal
1) Remove the special nut, ②.
2) Remove the SLEEVE ③ the COMPL HEAD BRACKET ① and the SPRING COIL ④, in that order.

Note: Take care not to scratch or soil the ACE head surface.

2. Remounting
1) Apply grease to the axle ⑥ as shown in Fig. A.
2) Apply grease to the spot where the COMPL HEAD BRACKET ① makes contact with the STOPPER ⑦.
3) Mount the SPRING COIL ④ and the COMPL HEAD BRACKET ①, in that order, onto the axle ⑥. Hook one end of the SPRING COIL ④ to the notch ⑤, and the other end to the COMPL HEAD BRACKET, so that the COMPL HEAD BRACKET is pressed against the STOPPER ⑦.
4) Mount the special nut ② onto the axle ⑥ through the SLEEVE ③.
5) Clean the ACE head surface with a chamois leather moistened with methyl alcohol.
6) Perform ACE head adjustment as instructed in 7-4.

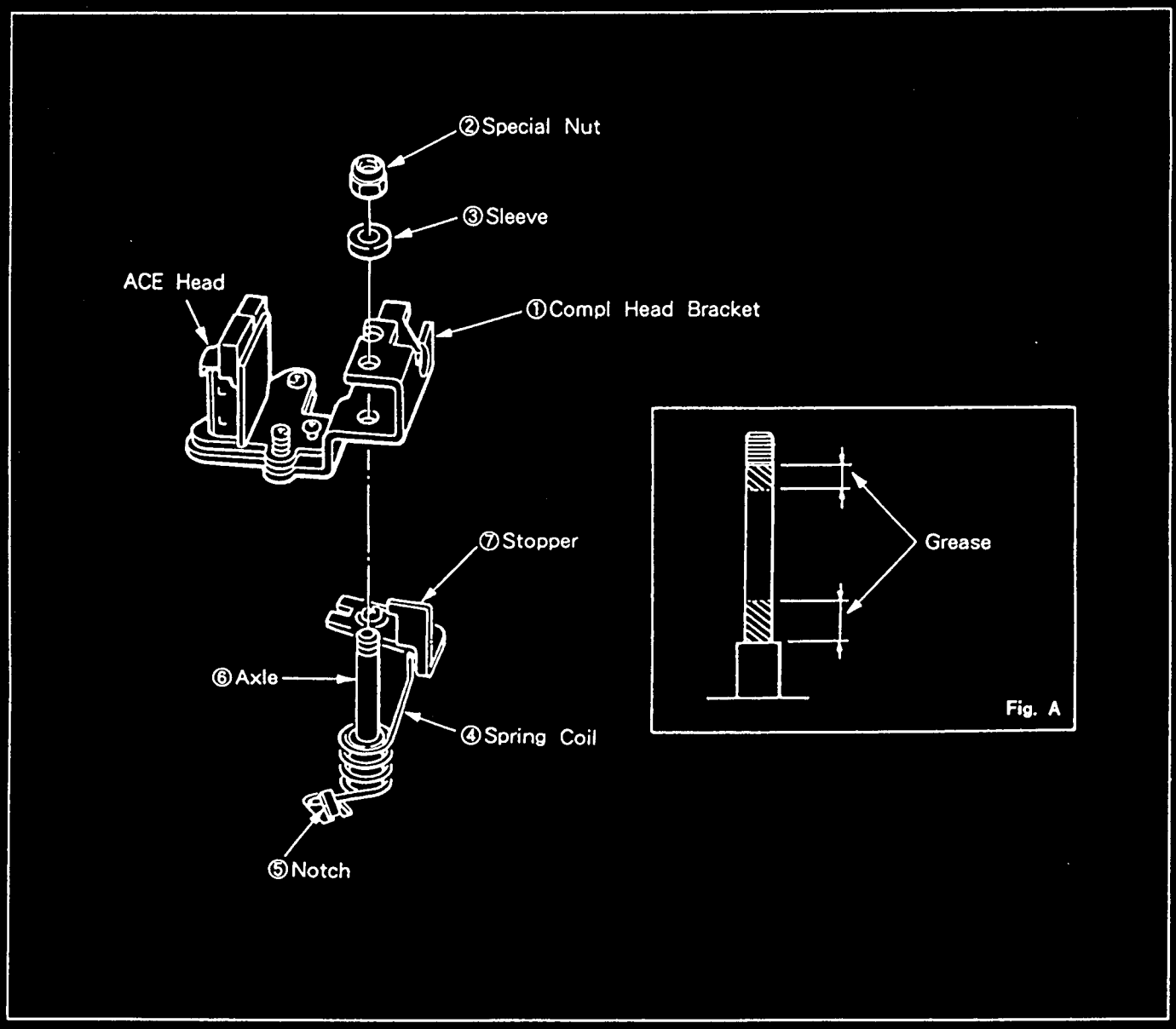


Fig. 7-7-12. Compl Head Bracket(ACE Head)

7-7-6.Pinch Roller Pressure Mechanism (See Fig. 7-7-13.)

1. Removal
1) Remove the COMPL CASSETTE MECHANISM as instructed in P.101.
2) Remove the COMPL HEAD BRACKET as instructed in 7-7-5.
3) Remove the PINCH SPRING COIL ①.
4) Remove the special washer ②, then remove the PINCH LEVER ASS'Y ③.
5) Remove the REV GUIDE LEVER SPRING COIL ④.
6) Remove REV GUIDE LEVER ASS'Y ⑥ from the hook ⑤ of the plastic bearing on the bottom side. Use a jig VHJ-0073 shown in Fig. 7-7-14. to widen the hook of the plastic bearing. By so doing, the above removal of the REV GUIDE LEVER ASS'Y ⑥ can be made more easily. Care should be taken to avoid pushing the jig VHJ-0073 too much. Pushing it too hard may damage the hook in an extreme case.
7) Remove the SLIDE BRAKE SPRING COIL ⑦.
8) Remove the special washer ⑧, then remove the PINCH CAM LEVER ASS'Y ⑨.
9) Remove the ACT PINCH SLIDE ASS'Y ⑩.

Note: If the hook ⑤ of the plastic bearing is damaged, reference should be made to Section 3. "Method of Repairing the Bearing Section of REV GUIDE LEVER ASS'Y".

2. Remounting
1) Apply grease to pins ⑫/⑬ and axles ⑯/⑱.
2) Apply grease to the ACT PINCH SLIDE ASS'Y pin ⑰.
3) Set the INITIAL mode with the mode selector (VHJ-0050).
4) Mount the ACT PINCH SLIDE ASS'Y ⑩ onto pins ⑫ and ⑬.
5) Insert the pin ⑭ of the PINCH CAM LEVER ASS'Y ⑨ into the MAIN CAM ⑪ GROOVE 1, and mount onto the axle ⑯ while inserting the ACT PINCH SLIDE ASS'Y pin ⑰ of the ACT PINCH SLIDE ASS'Y into the hole ⑮.
6) Mount the special washer ⑧ onto the axle ⑯.
7) Hook the SLIDE BRAKE SPRING COIL ⑦ to the plastic pin ⑲.
8) Mount the REV GUIDE LEVER ASS'Y ⑥ to the plastic molding bearing, then fix it with the hook ⑤ at the bottom.
9) Hook the REV GUIDE LEVER SPRING COIL ④.
10) Mount the PINCH LEVER ASS'Y ③ to the axle ⑱.
11) Mount the special washer ② to the axle ⑱.
12) Hook the PINCH SPRING COIL ① between the ACT PINCH SLIDE ASS'Y ⑩ and the PINCH LEVER ASS'Y ③.
13) Mount the COMPL HEAD BRACKET as instructed in 7-7-5.
14) Mount the COMPL CASSETTE MECHANISM as instructed in P.101.
15) Perform ACE head adjustment as instructed in 7-4.

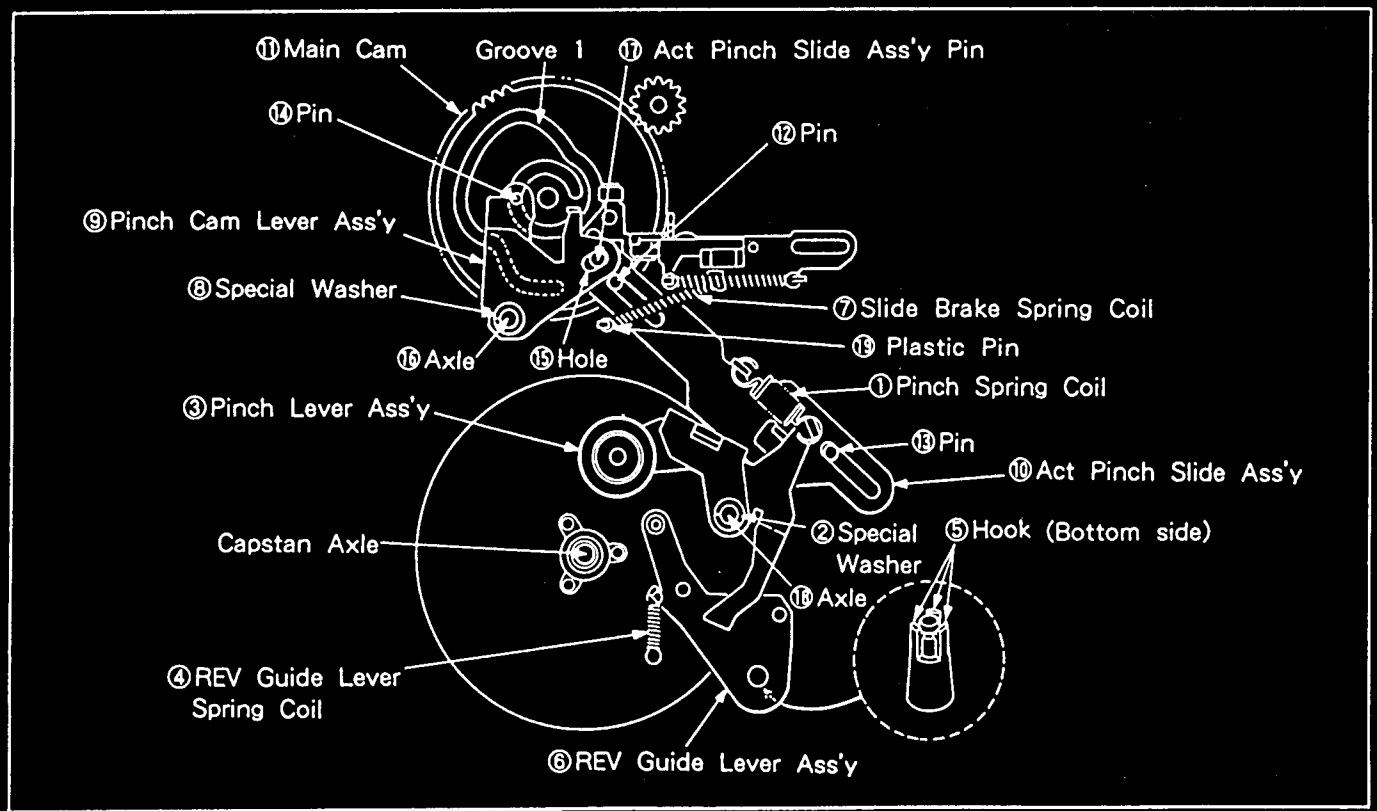
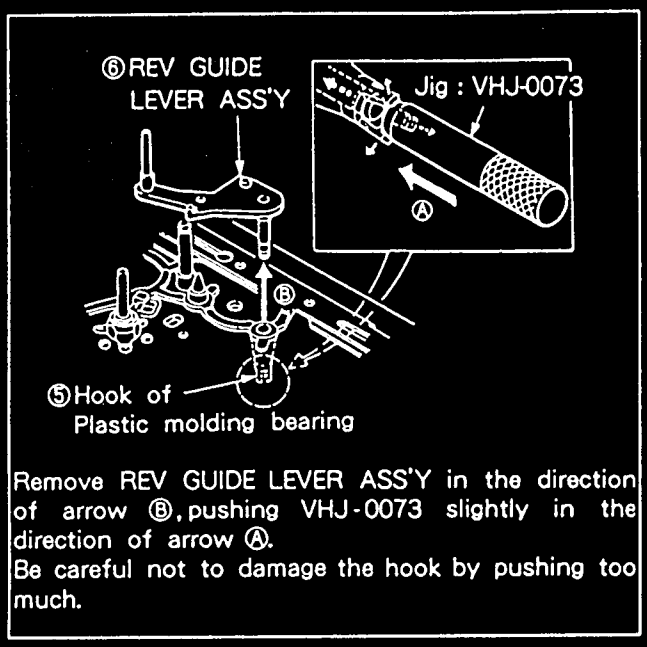


Fig. 7-7-13. Pinch Roller Pressure Mechanism



Remove REV GUIDE LEVER ASS'Y in the direction of arrow Ⓑ, pushing VHJ-0073 slightly in the direction of arrow Ⓐ.
Be careful not to damage the hook by pushing too much.

Fig. 7-7-14. Method of Using the jig VHJ-0073

3. Method of Repairing the Bearing Section of REV GUIDE LEVER ASS'Y

If the hook of the plastic molding bearing is damaged in the process of removing the REV GUIDE LEVER ASS'Y, proceed with the repair as follows :

1) Scrape the broken hook of the bearing section with a cutter knife and flatten it.
2) Insert the REV GUIDE LEVER ASS'Y in the bearing and fit a stopper washer in. The special washer to be used must be Part No. 3-735-755-01 WASHER (DIA.2.6). This special washer (part No. 3-735-755-01 WASHER (DIA.2.6)) is the same as that used on SUPPLY REEL ASS'Y or TAKE-UP REEL ASS'Y.

Remove the REV GUIDE LEVER ASS'Y toward an arrow B while pushing the jig VHJ-0073 lightly in the direction of an arrow.
Pushing the jig VHJ-0073 too much may cause hook breakage. Therefore, care should be taken.

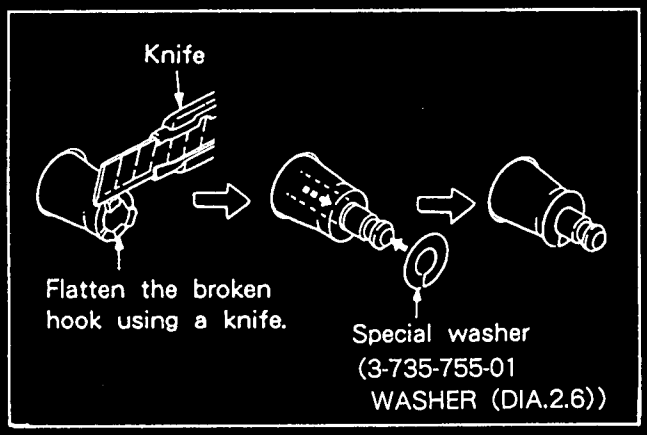


Fig. 7-7-15. Method of Repairing the Bearing Section of the REV GUIDE LEVER ASSEMBLY

7-7-7.Brake Mechanism

(1) SUB TAKE-UP BRAKE ASS'Y
(See Fig. 7-7-16.)

1. Removal
1) Remove the COMPL CASSETTE MECHANISM as instructed in P.101.
2) Remove the SPRING COIL ①.
3) While pushing the hook ② in the direction of arrow, remove the SUB TAKE-UP BRAKE ASS'Y ③.

2. Remounting
1) Mount the SUB TAKE-UP BRAKE ASS'Y ③ onto the pin ④. Confirm that the hook ② is firmly hooked to the chassis.
2) Fit the SPRING COIL between hooks ⑤ and ⑥.
3) Mount the COMPL CASSETTE MECHANISM as instructed in P.101.

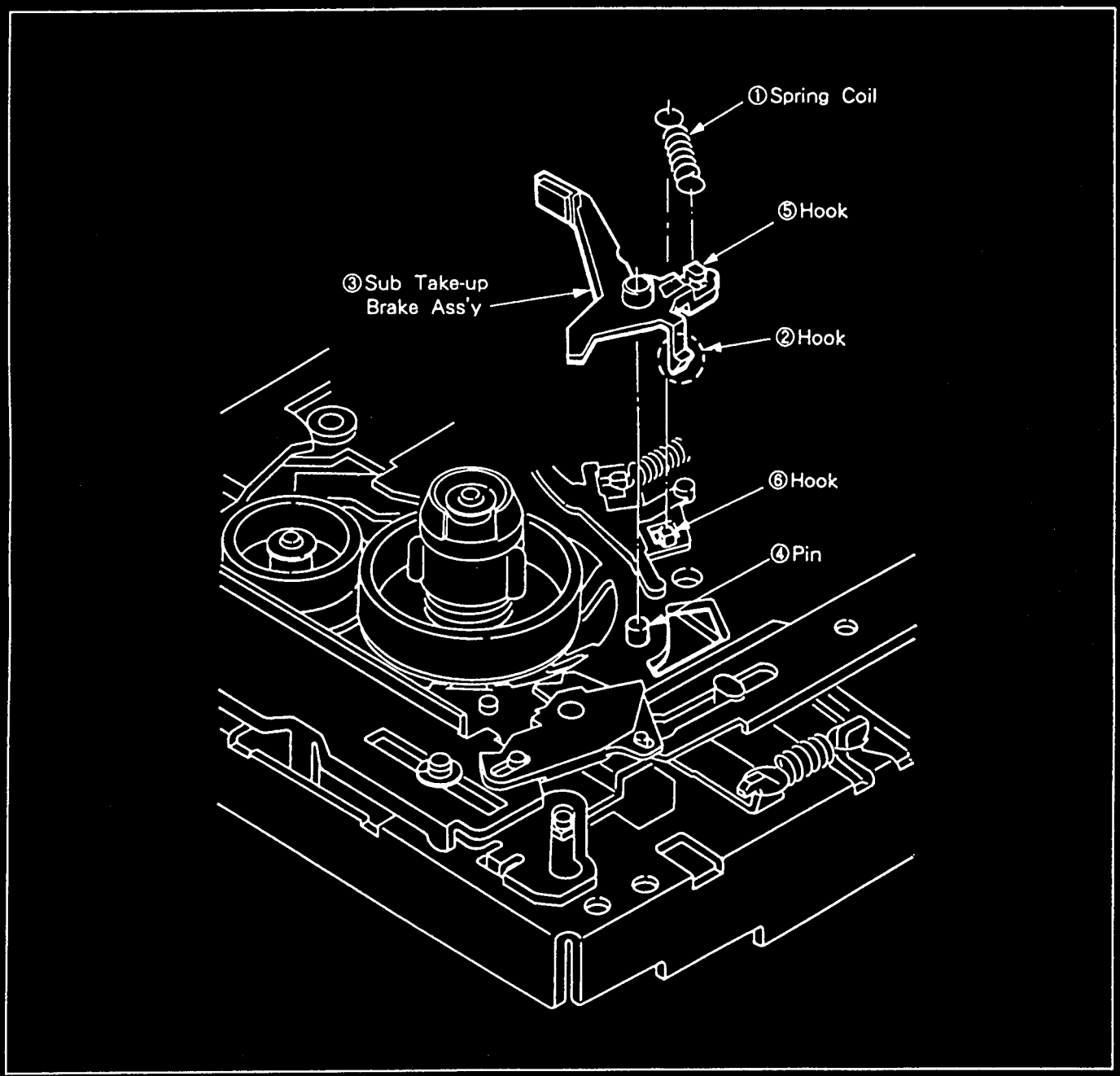


Fig. 7-7-16. Sub Take-up Brake Ass'y

(2) SUPPLY BRAKE ASS'Y AND TAKE-UP BRAKE ASS'Y (See Fig. 7-7-17)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in P.101.
2) Remove the SUB TAKE-UP BRAKE as instructed in P.116.
3) Remove the special washer ①, then remove the CONTROL PLATE LEVER ②.
4) Remove the two special washers ③, then remove the M PLATE SLIDE ASS'Y ④.
5) Remove the SPRING COIL ⑤.
6) Remove the SUPPLY BRAKE ASS'Y ⑥ and the TAKE-UP BRAKE ASS'Y ⑦.

Note: Take care not to soil the brake shoes.

2. Remounting

1) Apply a thin layer of grease to axles ⑧ and ⑨.
2) Mount the TAKE-UP BRAKE ASS'Y ⑦ onto the axle ⑧.
3) Mount the SUPPLY BRAKE ASS'Y ⑥ onto the axle ⑨.
4) After applying a thin layer of grease to the M PLATE SLIDE ASS'Y ④ as shown in Fig. A, mount it onto the two pins ⑩.
5) Mount the two special washers ③ onto the two pins ⑩.
6) After applying grease to the CONTROL PLATE LEVER ② as shown in Fig. B, mount it onto the axle ⑪. Insert the pin ⑫ of the ACT PLATE SLIDE ASS'Y into the hole ⑭, and the pin ⑬ of M PLATE SLIDE ASS'Y into the hole ⑮.
7) Mount the special washer ① onto the pin ⑫.
8) Mount the SUB TAKE-UP BRAKE as instructed in P.116.
9) Mount the COMPL CASSETTE MECHANISM as instructed in P.101.

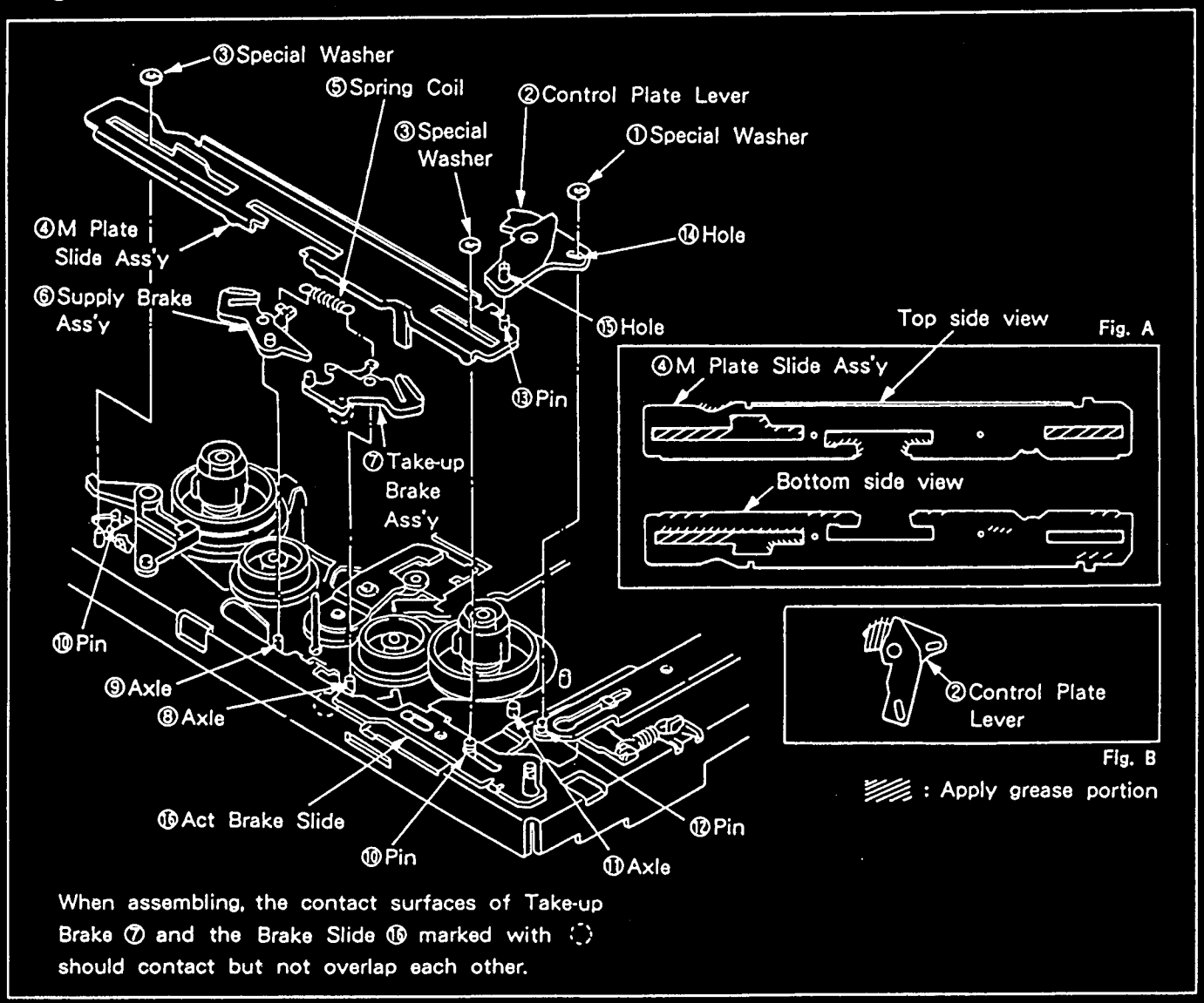


Fig. 7-7-17. Supply Brake Ass'y & Take-up Brake Ass'y

(3) TENSION LEVER ASS'Y AND BAND HOLDER ASSY (See Fig. 7-7-18)

1. Removal

1) Remove the CASSETTE HOLDER MECHANISM as instructed in P.101.
2) Remove the SPRING COIL ①.
3) Remove the screw ③ and washer ⑭ fixing the BAND BRAKE BRACKET ASS'Y ②.
4) Push the SUB SUPPLY BRAKE ④ in the direction of the arrow, setting the BAND BRAKE BRACKET ASS'Y ② free.
5) Open the hook ⑤ a little and remove the TENSION LEVER ASS'Y ⑥. Take care not to open the hook ⑤ too much, otherwise it may be deformed or broken.
6) Remove the hook ⑦ of the BAND BRAKE BRACKET ASS'Y.
7) Remove the fixing washer ⑮ and then remove the SPRING COIL ⑯ and the BAND LEVER ASS'Y ⑰.

2. Remounting

1) Mount the SPRING COIL ⑯ and the BRAKE BAND LEVER ASS'Y ⑰ to the axle (21) with the fixing washer ⑮, inserting the both ends of the SPRING COIL ⑯ into the SPRING COIL holding holes ⑱ and ⑲.
2) Mount the BAND BRAKE BRACKET ASS'Y hook ⑦ into the TENSION LEVER ASS'Y hole ⑧. Insert the TENSION LEVER ASS'Y axle ⑨ into the plastic bearing hole ⑩ and confirm that the hook ⑤ is hooked.
3) While pushing the SUB SUPPLY BRAKE ④ in the direction of arrow A, wind the BAND BRAKE BRACKET ASS'Y ② around the side of the SUPPLY REEL ASS'Y ⑳.
4) Mount the BAND BRAKE BRACKET ASS'Y ② to the BRAKE BAND LEVER ASS'Y ⑰ with the screw ③ through the washer ⑭.
5) Hook the SPRING COIL ① between the hooks ⑪ and ⑫.
6) Perform TENSION POLE position adjustment as instructed in 7-3 (P.85).
7) Mount the CASSETTE HOLDER MECHANISM as instructed in P.101.

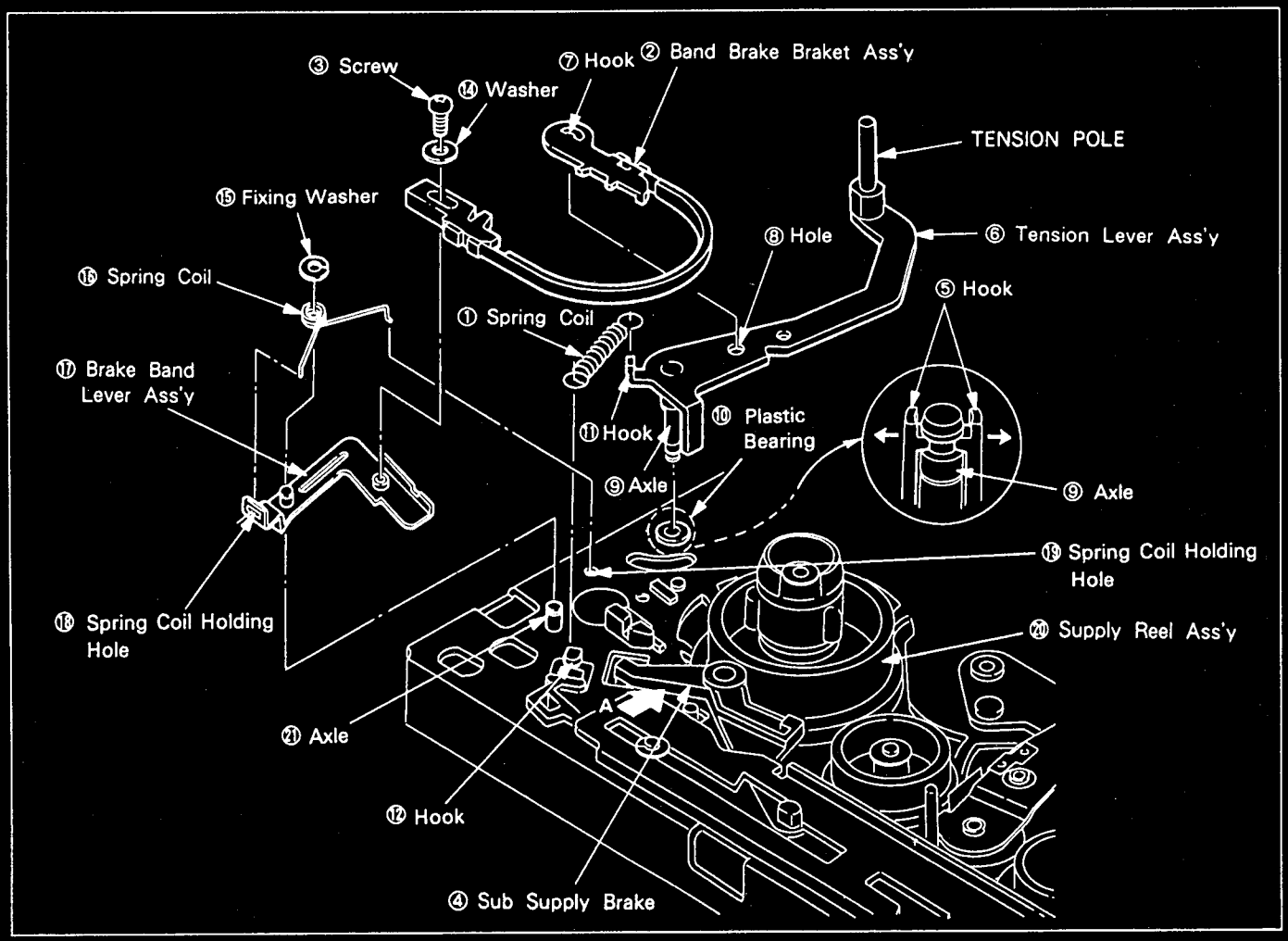


Fig. 7-7-18. Tension Lever Ass'y & Band Holder Ass'y

(4) CAPSTAN BRAKE ASS'Y (See Fig. 7-7-19)

1. Removal

1) Remove the SPRING COIL ①.
2) Unhook the hook ②, then remove the CAPSTAN BRAKE ASS'Y ③.

2. Remounting

1) Mount the CAPSTAN BRAKE ASS'Y ③ onto the axle ④. Confirm that the hook ② is hooked to the chassis.
2) Hook the SPRING COIL ① between hooks ⑤ and ⑥. Fix the hook ⑥ side with adhesive (use an adhesive that allows later detaching).

Note: As for the model with two video heads, there are two types : one with the spring coil ① and CAPSTAN BRAKE ASS'Y ③ mounted, and one where these parts are not mounted.

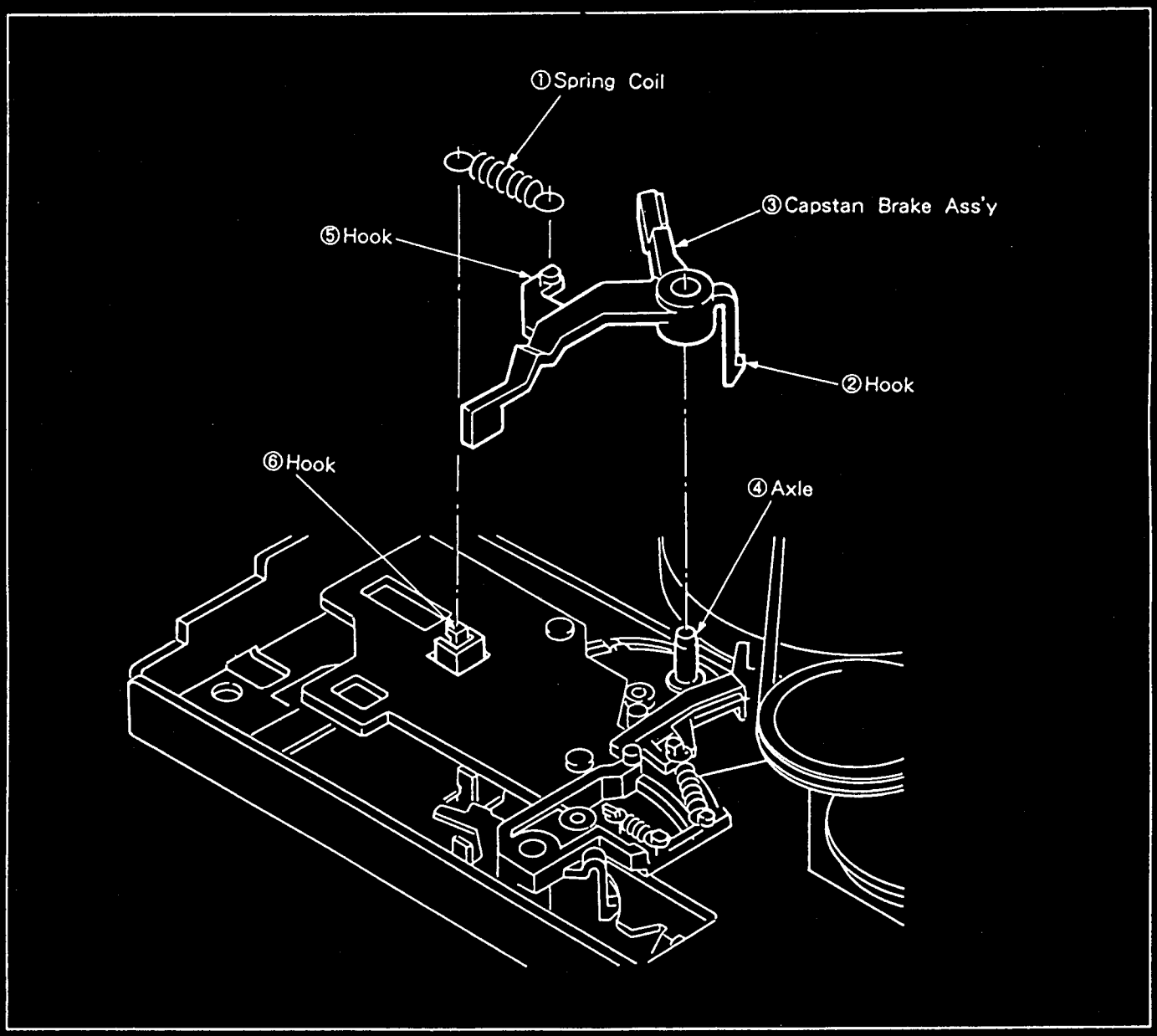


Fig. 7-7-19. Capstan Brake Ass'y

7-7-8.Reel Table Drive Mechanism

(1) SUPPLY REEL ASS'Y AND SUPPLY REEL GEAR (See Fig. 7-7-20.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in P.101.
2) Remove the BAND HOLDER ASS'Y as instructed in P.118.
3) Set the PLAY mode with the mode selector (VHJ-0050).
4) Remove the special washer ①, then remove the SUPPLY REEL ASS'Y ② and the washer ③.
5) Remove the special washer ④.
6) While pushing the SUPPLY BRAKE ASS'Y ⑤ in the direction of arrow A, remove the SUPPLY REEL GEAR ⑥ and the washer ⑦.

Note: Be sure that no dirt gets on the section where both brake shoes make contact.

2. Remounting

1) Apply a little oil (less than one drop) to the part of the axle ⑧ indicated by the arrow B, then mount the washer ⑦.
2) While pushing the SUPPLY BRAKE ASS'Y ⑤ in the direction of arrow A, mount the SUPPLY REEL GEAR ⑥ onto the axle ⑧.
3) Mount the special washer ④ to the axle ⑧.
4) Apply 1 drop of oil to the part of the axle ⑨ indicated by the arrow C, then mount the washer ③.
5) Mount the SUPPLY REEL ASS'Y ② onto the axle ⑨.
6) Perform reel table height adjustment as instructed in P.83.
7) Mount the special washer ① onto the axle ⑨.
8) Mount the BAND HOLDER ASS'Y as instructed in P.118.
9) Perform tension pole position adjustment as instructed in 7-3.
10) Mount the COMPL CASSETTE MECHANISM as instructed in P.101.

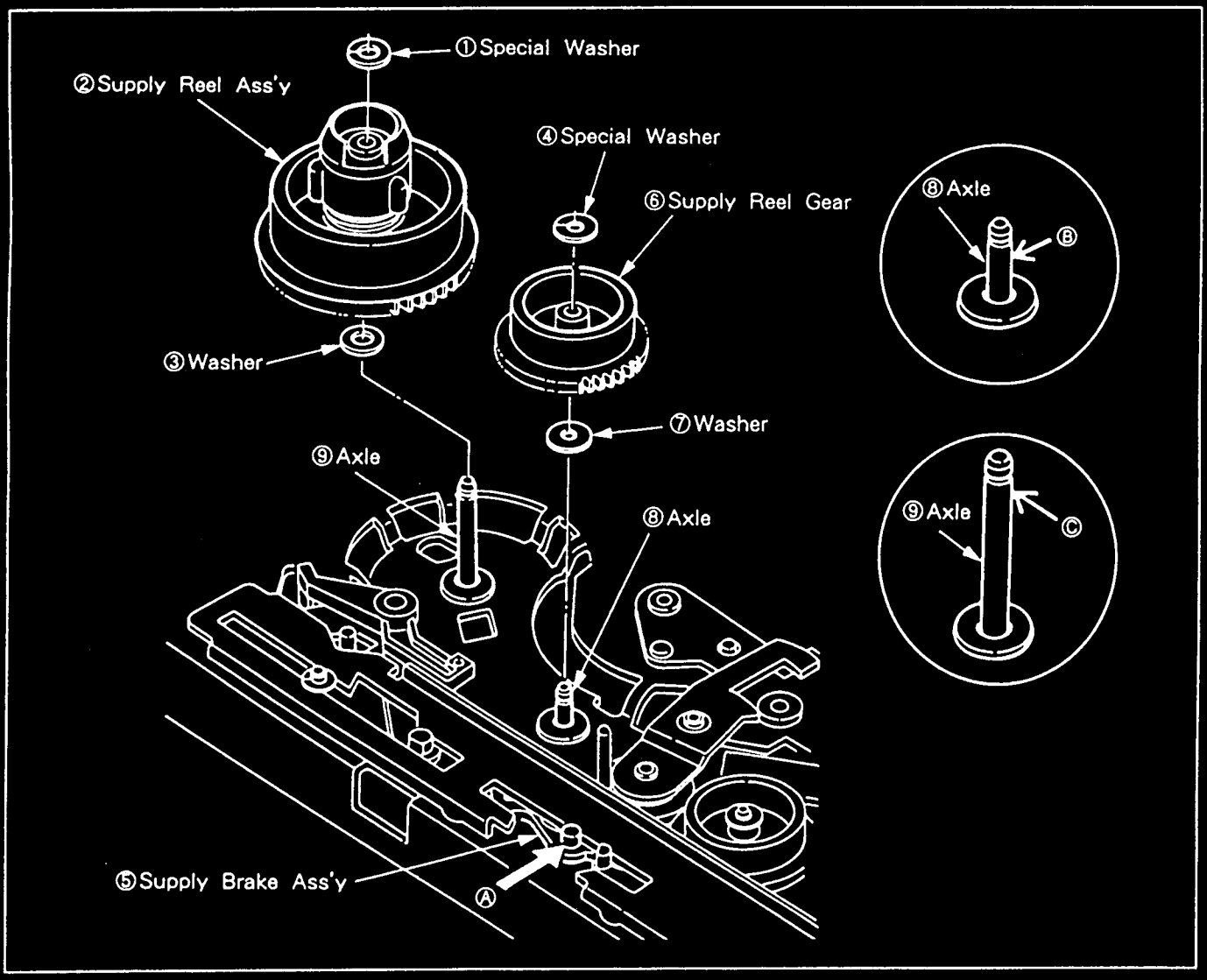


Fig. 7-7-20. Supply Reel Ass'y & Supply Reel Gear

(2) TAKE-UP REEL ASS'Y (See Fig. 7-7-21.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in P.101.
2) Remove the special washer ①.
3) Push the SUB TAKE-UP BRAKE ASS'Y ② in the direction of arrow A to release the brake, then remove the TAKE-UP REEL ASS'Y ③ and the washer ④.

Note: Be sure that no dirt gets on the section where both brake shoes make contact.

2. Remounting

1) Apply 1 drop of oil to the part of the axle ⑤ indicated by the arrow B, then mount the washer ④.
2) While pushing the SUB TAKE-UP BRAKE ASS'Y ② in the direction of arrow A, mount the TAKE-UP REEL ASS'Y ③ onto the axle ⑤.
3) Perform reel table height adjustment as instructed in 7-2.
4) Mount the special washer ① onto the axle ⑤.
5) Mount the COMPL CASSETTE MECHANISM as instructed in P.101.

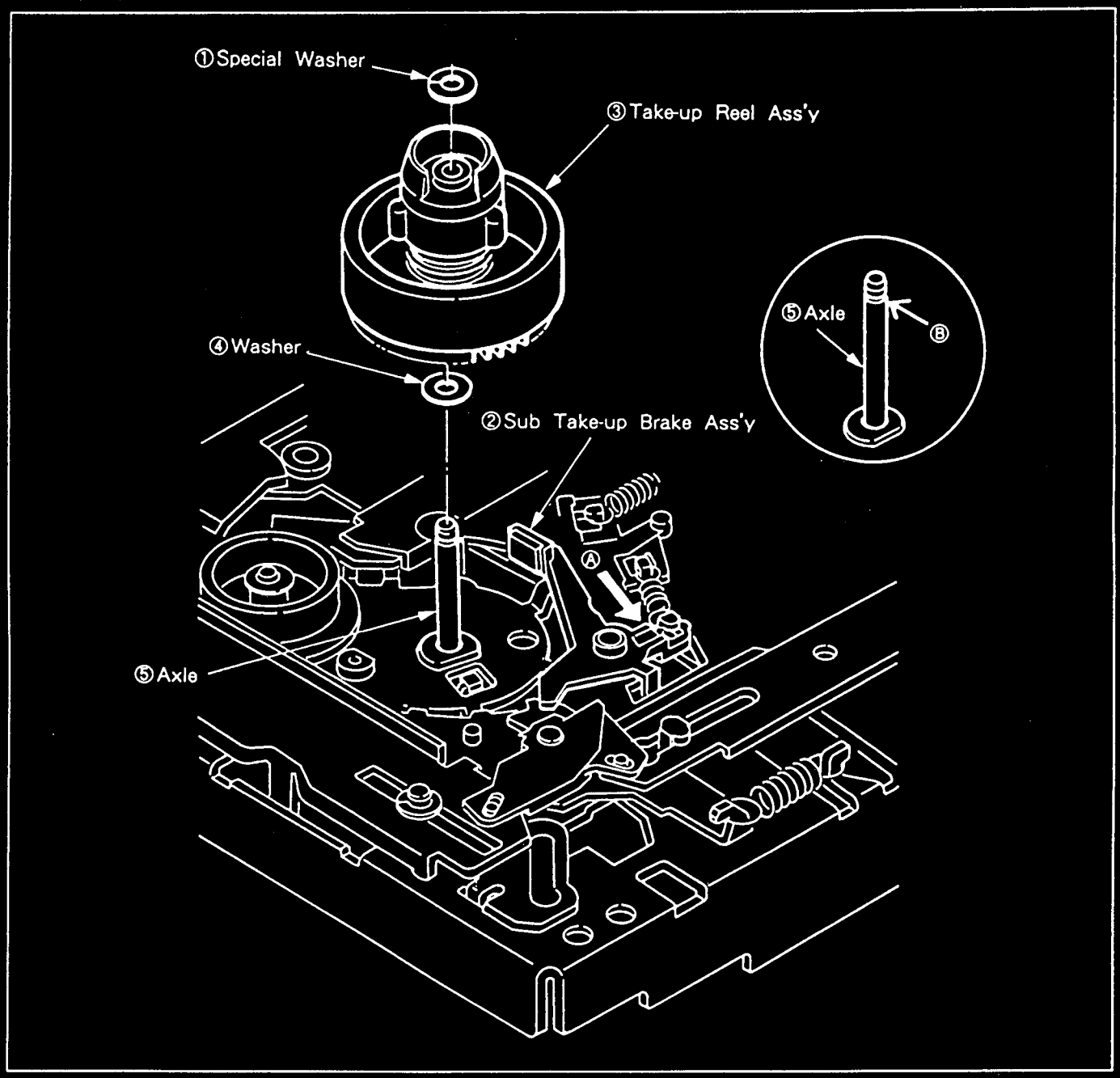


Fig. 7-7-21. Take-up Reel Ass'y

(3) TAKE-UP REEL GEAR (See Fig. 7-7-22.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in P.101.
2) Remove the TAKE-UP REEL ASS'Y as instructed in P.121.
3) Remove the SUB TAKE-UP BRAKE ASS'Y as instructed in P.116.
4) Remove the TAKE-UP BRAKE ASS'Y as instructed in P.117.
5) Remove the special washer ①, then remove the TAKE-UP REEL GEAR ③ and the washer ④.

2. Remounting

1) Apply a little oil (less than one drop) to the part of the axle ⑤ indicated with an arrow.
2) Mount the washer ④ and the TAKE-UP REEL GEAR ③ onto the axle ⑤.
3) Mount the special washer ① onto the axle ⑤.
4) Mount the TAKE-UP BRAKE ASS'Y as instructed in P.117.
5) Mount the SUB TAKE-UP BRAKE ASS'Y as instructed in P.116.
6) Mount the TAKE-UP REEL ASS'Y as instructed in P.121.
7) Mount the COMPL CASSETTE MECHANISM as instructed in P.101.

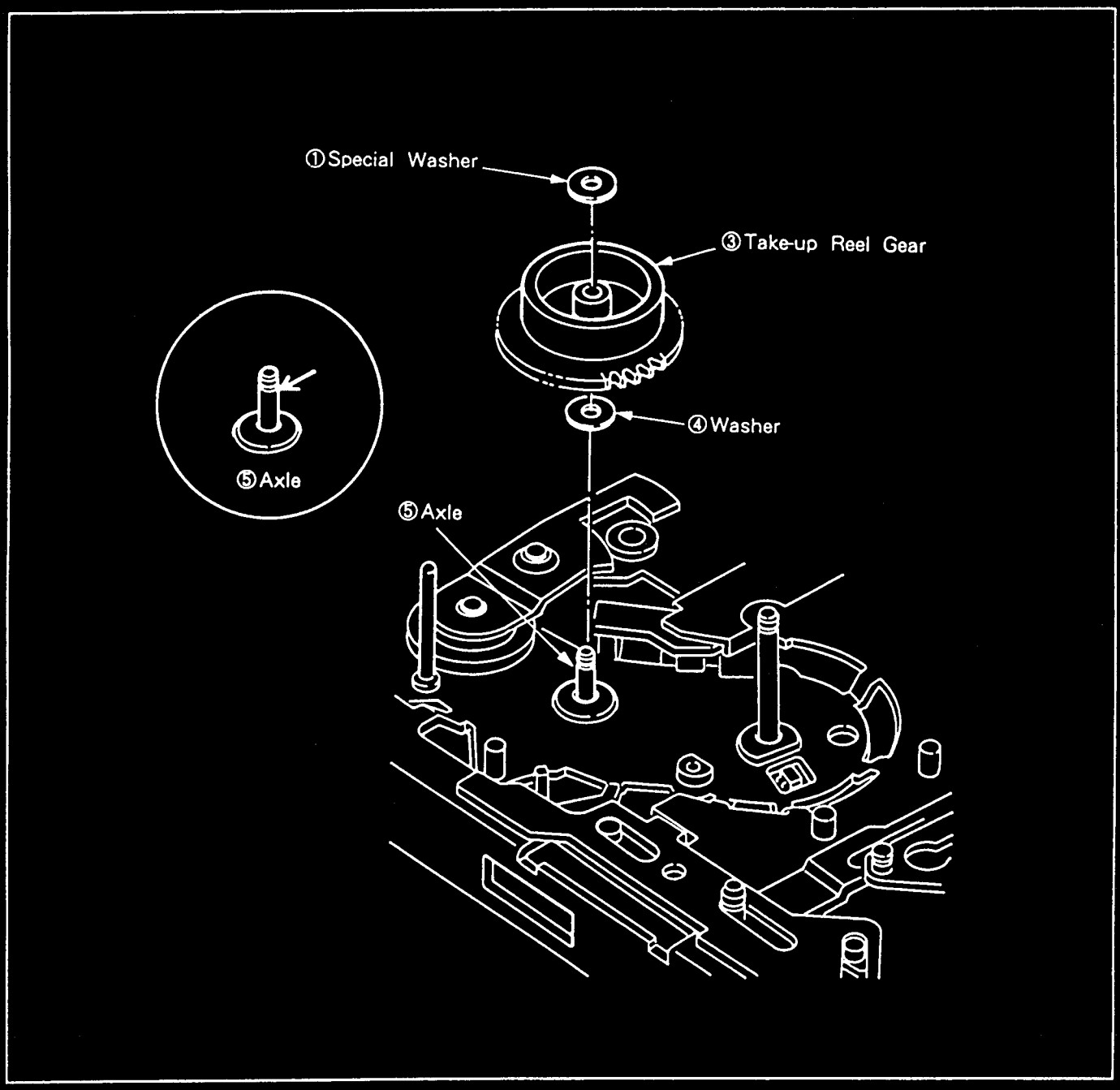


Fig. 7-7-22. Take-up Reel Geay

(4) REEL PULLEY AND FRICTION GEAR ASS'Y
(See Fig. 7-7-23.)

1. Removal
1) Remove the two screws ①, then remove the PULLEY BRACKET ②.
2) Remove the REEL DRIVE BELT ③.
3) Remove the special washer ④, then remove the REEL PULLEY ⑤.
4) Remove the special washer ⑥, then remove the FRICTION GEAR ASS'Y ⑦ and the washer ⑧.

Note: Some model may not incorporate the pulley bracket ②. Washer ⑫ is mounted on the pin ⑪ with a screw ①, and servesas the PULLEY BRACKET ②.

2. Remounting
1) Apply one drop of oil to the parts of axles ⑨ and ⑩ indicated with arrows.
2) Mount the washer ⑧ and the FRICTION GEAR ASS'Y ⑦ onto the axle ⑨.
3) Mount the special washer ⑥ onto the axle ⑨.
4) Mount the REEL PULLEY ⑤ onto the axle ⑩.
5) Mount the special washer ④ onto the axle ⑩.
6) Set the REEL DRIVE BELT ③.
7) Mount the PULLEY BRACKET ② with the two screws ①.

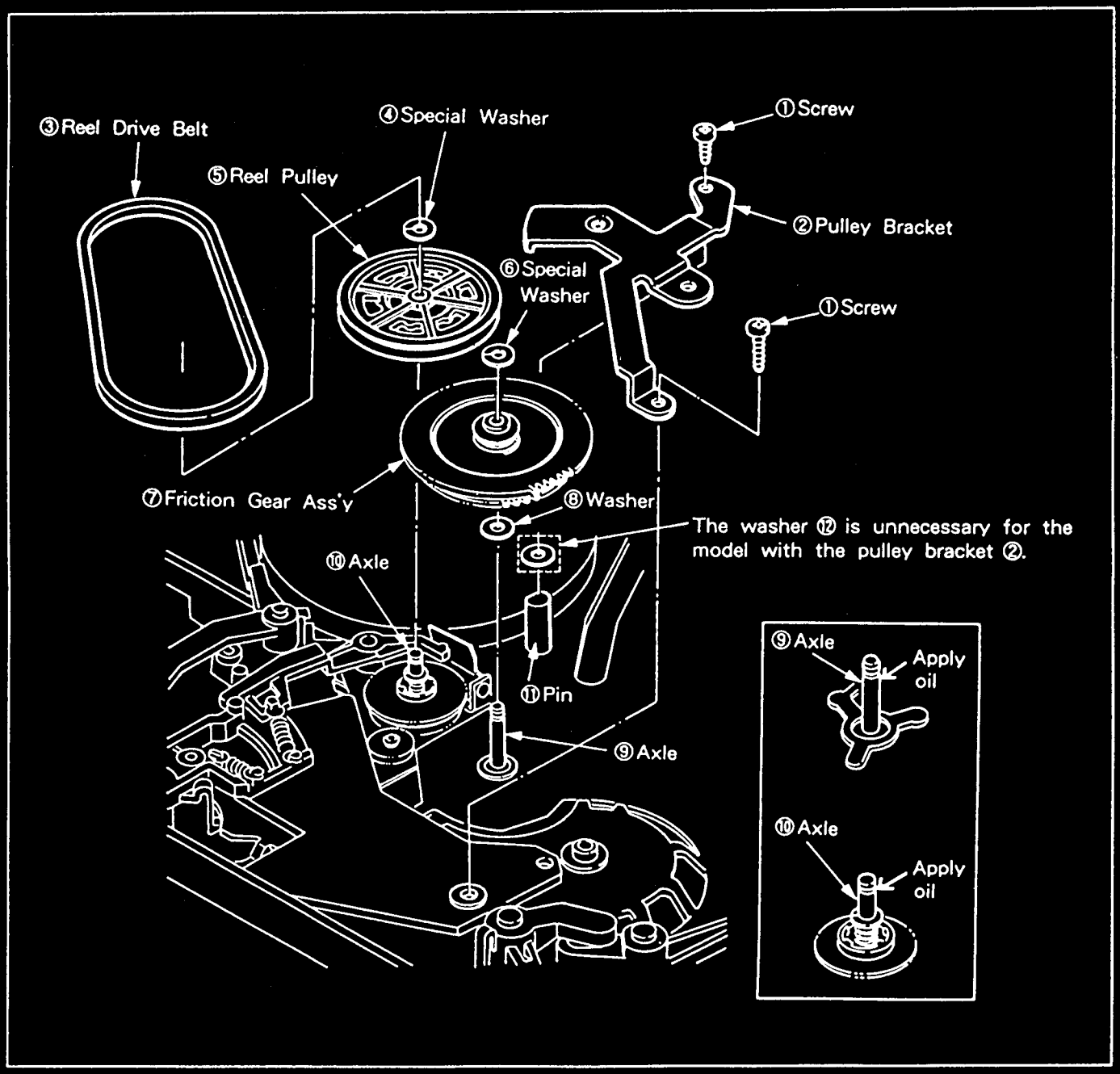


Fig. 7-7-23. Reel Pulley & Friction Gear

(5) COMPL CLUTCH (See Fig. 7-7-24.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in P.101.
2) Remove the PULLEY BRACKET, the REEL DRIVE BELT and the REEL PULLEY as instructed in P.123.
3) Remove the screw ①, then remove the COMPL MC-4 ②.
4) Remove the two screws ③, then remove the COMPL CLUTCH ④.

2. Remounting

1) Mount the COMPL CLUTCH ④ with the two screws ③, aligning it with the protuberance ⑤.
2) After inserting the CN831 (COMPL MC-4) into the CN801 (COMPL MC-1), mount the COMPL MC-4 with the screw ①.
3) Mount the REEL PULLEY, the REEL DRIVE BELT and the PULLEY BRACKET as instructed in P.123.
4) Mount the COMPL CASSETTE MECHANISM as instructed in P.101.

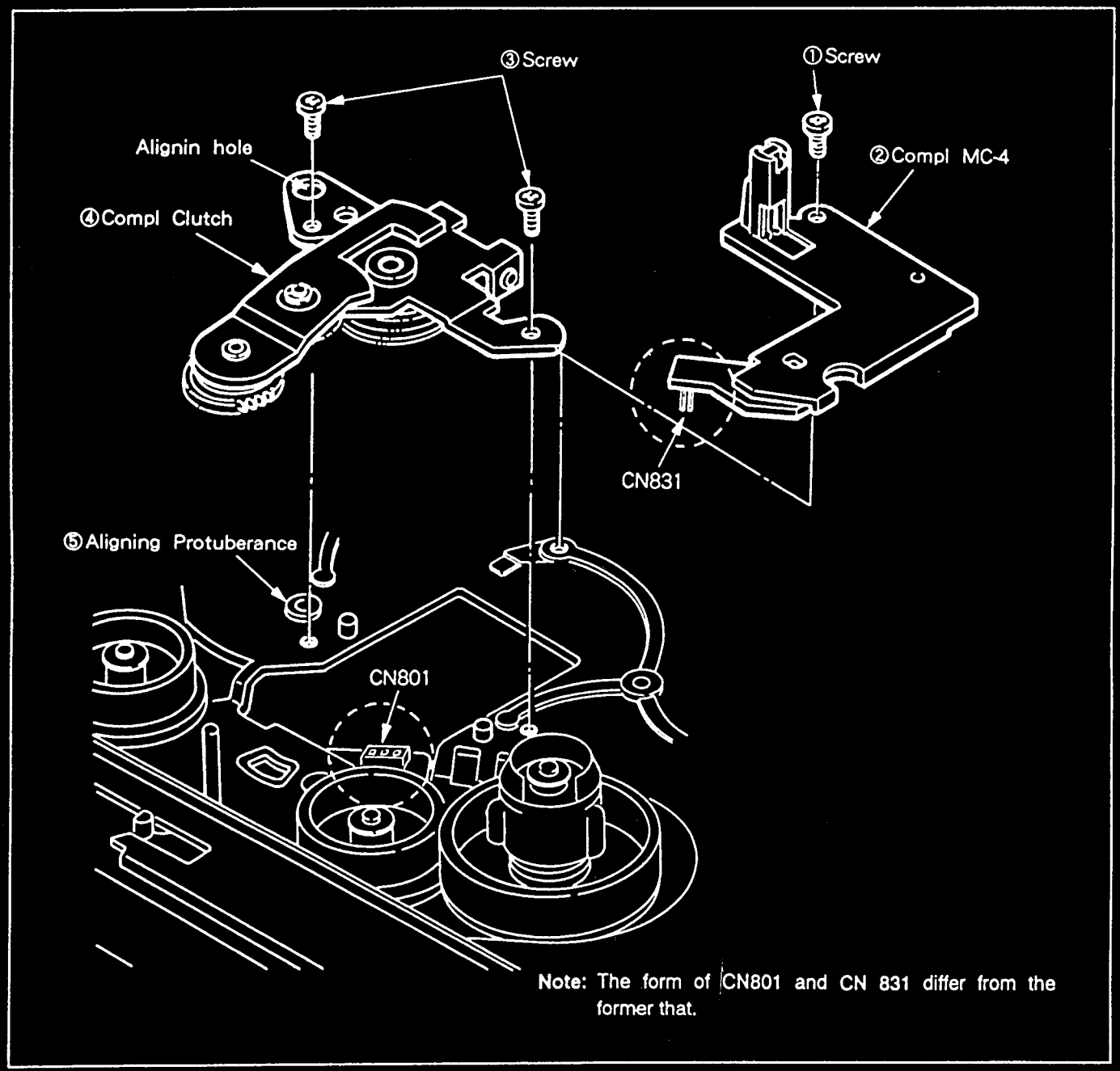


Fig. 7-7-24. Compl Clutch

(6) CLUTCH CHANGE LEVER AND CLUTCH LEVER ASS'Y (See Fig. 7-7-25.)

1. Removal

1) Remove the CAPSTAN BRAKE ASS'Y as instructed in P.119.
2) Remove the PULLEY BRACKET, the REEL DRIVE BELT and the REEL PULLEY as instructed in P.123.
3) Remove the SPRING COIL ①.
4) Unhook the hook ②, then remove the CLUTCH CHANGE LEVER ③.
5) Unhook the hook ⑤, then remove the CLUTCH LEVER ASS'Y ⑥.

2. Remounting

1) Mount the CLUTCH LEVER ASS'Y ⑥ onto the axle ⑦. Confirm that the hook ⑤ is hooked to the chassis.
2) Mount the CLUTCH CHANGE LEVER ③ onto the axle ⑧. Confirm that the hook ② is hooked to the chassis.
3) Hook the SPRING COIL ① between the hooks ⑨ and ⑩.
4) Mount the PULLEY BRACKET, the REEL DRIVE BELT and the REEL PULLEY as instructed in P.123.
5) Mount the CAPSTAN BRAKE ASS'Y as instructed in P.119.

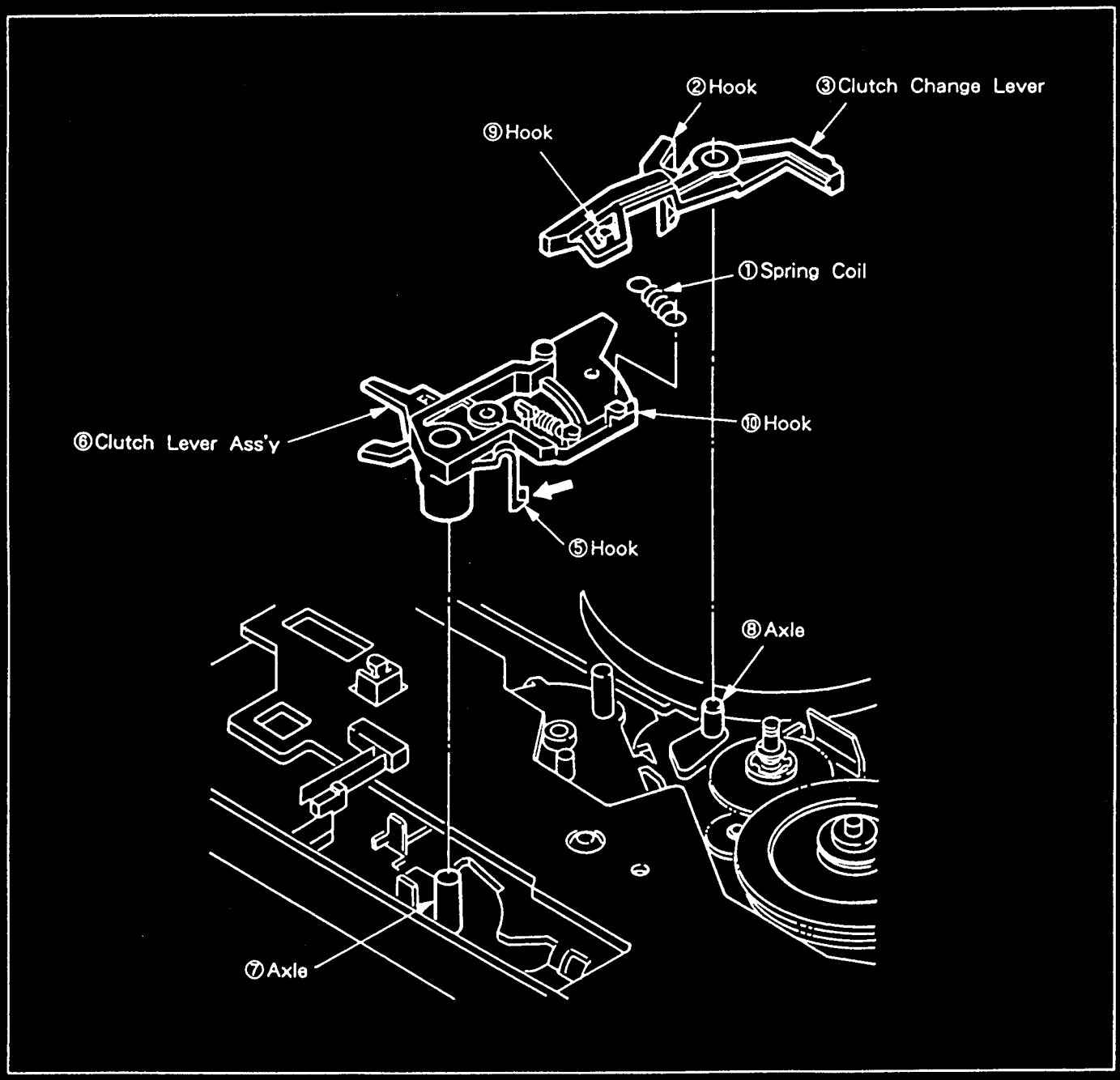


Fig. 7-7-25. Clutch Change Lever & Clutch Lever Ass'y

7-7-9.Capstan Motor (See Fig. 7-7-26.)

1. Removal
1) Remove the CAPSTAN BRAKE ASS'Y as instructed in P.119.
2) Remove the CAPSTAN MOTOR ⑥ connector.
3) Remove the REEL DRIVE BELT ② from the CAPSTAN MOTOR PULLEY ①.
4) Remove the two screws ④ fixing the COMPL CASSETTE MECHANISM TOP BOARD ③, then slide the TOP BOARD ③ backward.
5) Remove the three screws ⑤, then remove the CAPSTAN MOTOR ⑥.

Note: Take care not to scratch or soil the capstan axle.

2. Remounting
1) Mount the CAPSTAN MOTOR ⑥ with the three screws ⑤.
2) Connect the CAPSTAN MOTOR ⑥ connector.
3) Mount the TOP BOARD ③ with the two screws ④.
4) Fit the REEL DRIVE BELT ② around the CAPSTAN MOTOR PULLEY ① and the REEL PULLEY ⑦.
5) Mount the CAPSTAN BRAKE ASS'Y as instructed in P.119.

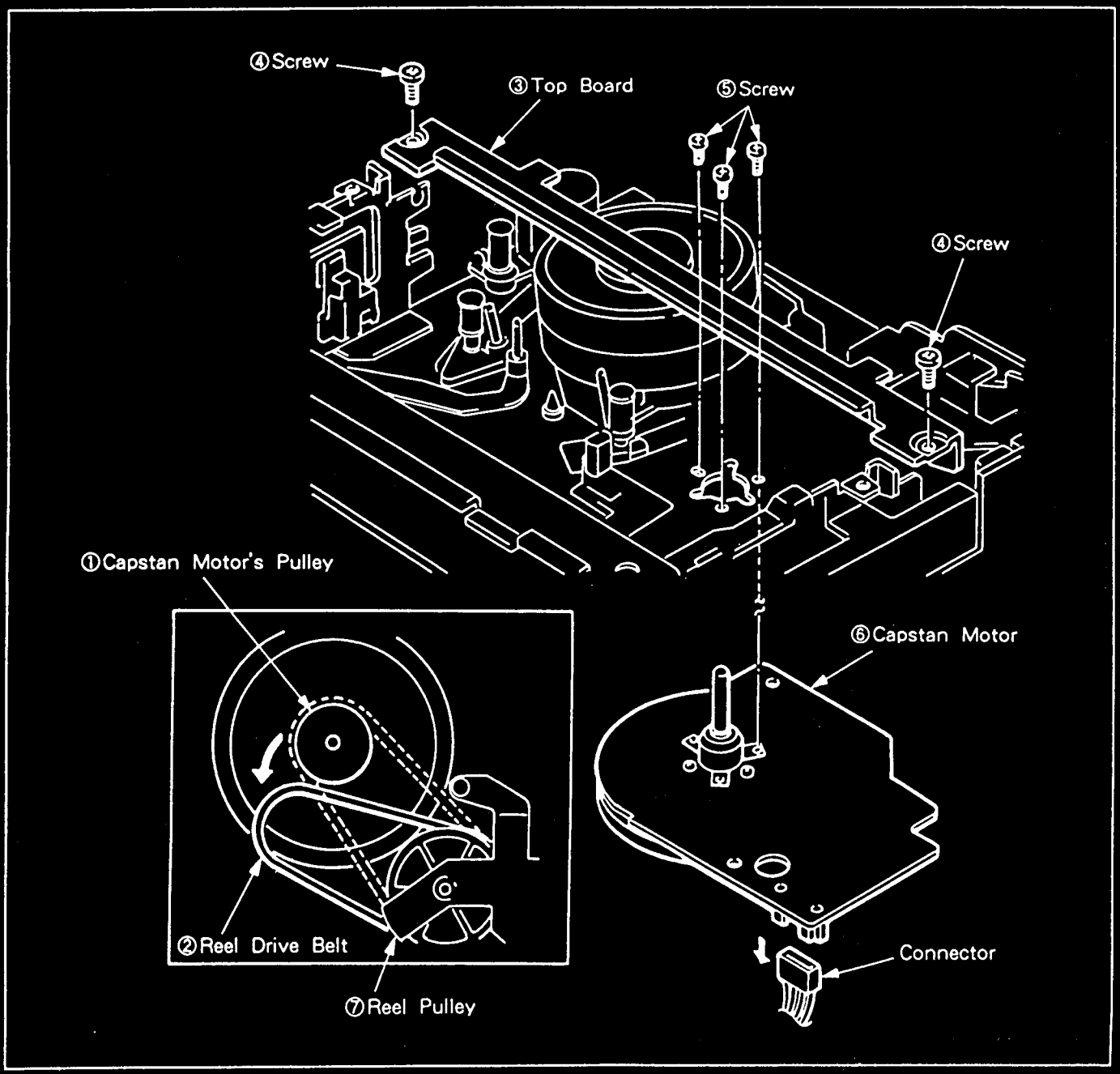


Fig. 7-7-26. Capstan Motor

7-7-10. Fixed Guide, FE Head Lever Ass'y

(1) S-SIDE FIXED GUIDE AND FE LEVER ASS'Y (See Fig. 7-7-27.)

1. Removal

1) Remove the special nut ①, then remove the GUIDE PIPE ③ and the special washer ② (lower), in that order.
2) Remove the SPRING COIL ⑤.
3) Remove the FTE HEAD connector.
4) Remove the special washer ⑥, then remove the FE HEAD LEVER ASS'Y ⑦.

2. Remounting

1) After mounting the FE LEVER ASS'Y ⑦ onto the axle ⑧, mount the special washer ⑥.
2) Hook the SPRING COIL ⑤ between the chassis notch ⑨ and the FE LEVER ASS'Y hook ⑩.
3) Mount the special washer ② (lower), the GUIDE pipe ③ and the special nut ① to the axle ⑧, in that order. At that time, do not excessively tighten the special nut ① to avoid idle rotation of the axle rivet. The height of fixing guide on the inlet side is not required.
4) Connect the connector to the FTE HEAD.

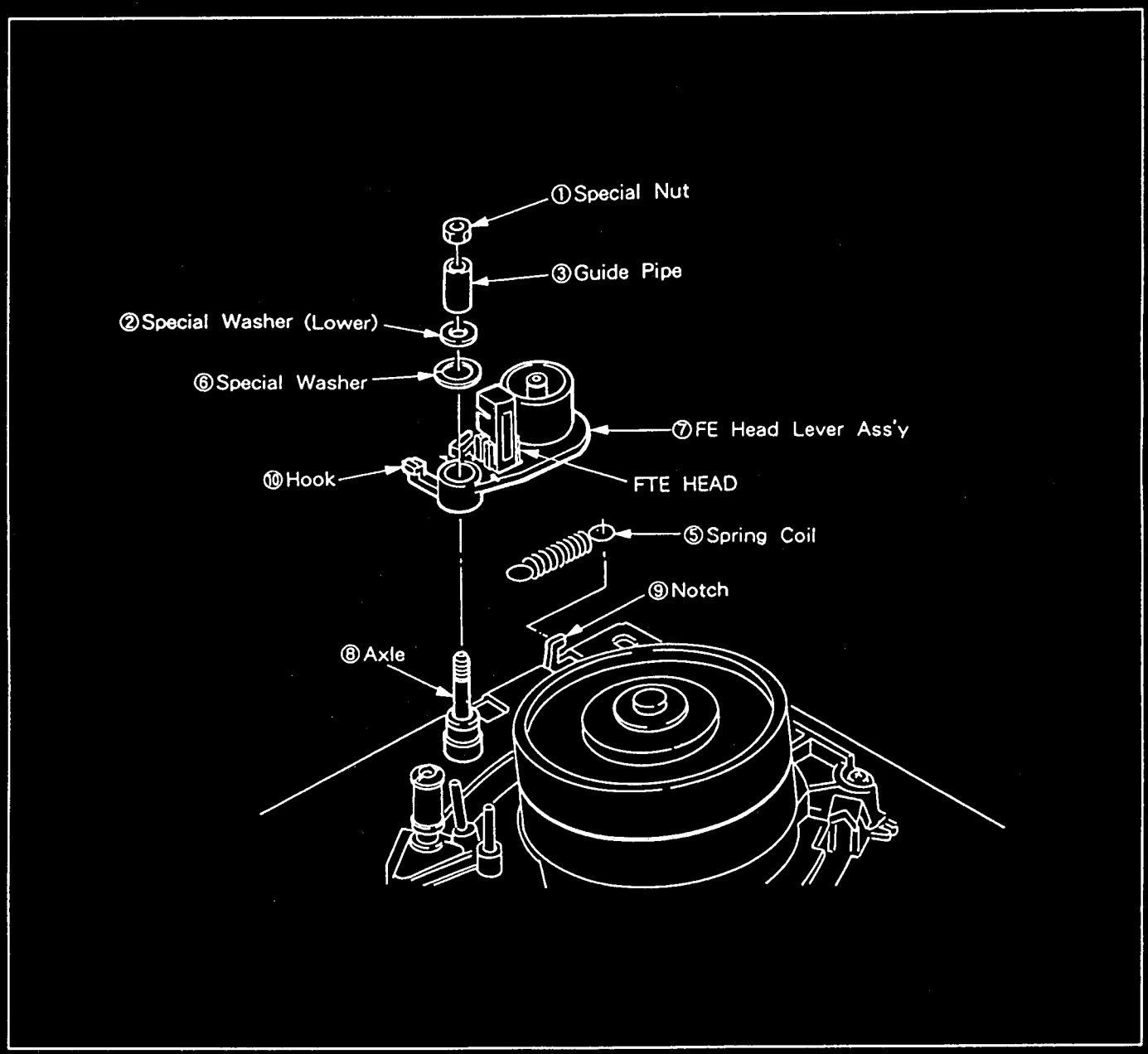


Fig. 7-7-27. Fixed Guide(S)& FE Lever Ass'y

(2) IMPEDANCE ROLLER, FTE HEAD
(See Fig. 7-7-28.)

1. Removal

1) Remove the FTE HEAD (full track erase head) ① connector.
2) Remove the special washer ②, then remove the IMPEDANCE ROLLER ③ and the washer ④.
3) Open the hook ⑤ a little and remove the FTE HEAD ①.

Note: Take care not to open the hook too much, otherwise it may be deformed or broken.

2. Remounting

1) Mount the FTE HEAD ① onto the FE HEAD LEVER ASS'Y ⑥. Confirm that the hook ⑤ is hooked to the FTE HEAD ①.
2) Mount the washer ④ and the IMPEDANCE ROLLER ③, in that order, onto the axle ⑦, then mount the special washer ②.
3) Connect the connector to the terminal of the FTE HEAD ①.

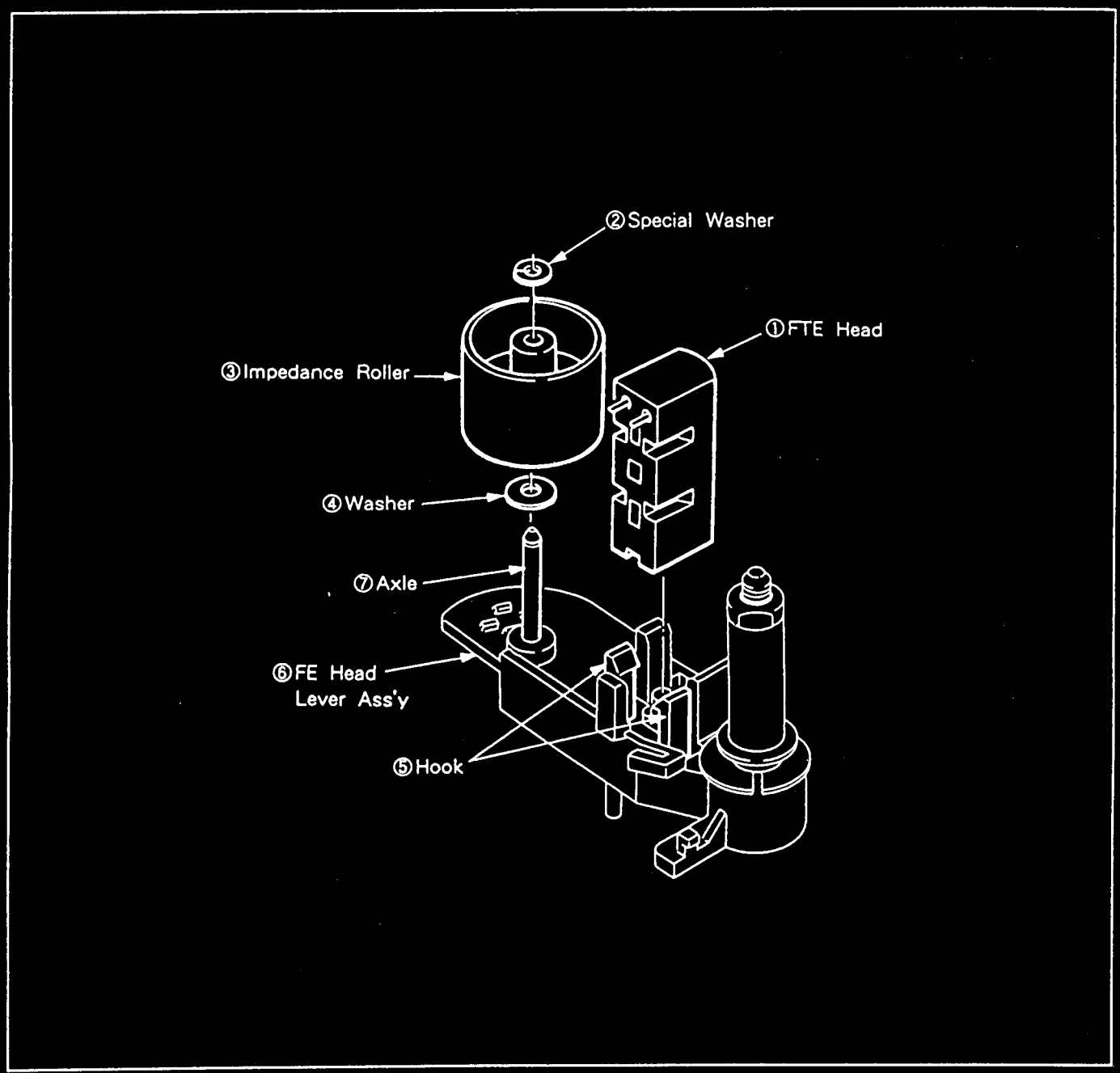


Fig. 7-7-28. Impedancd Roller & FTE Head

(3) FIXED GUIDE (T) (See Fig. 7-7-29.)

1. Removal

1) Remove the CAP ①.

2) Remove the special nut ②, then remove the special washer ③ (upper), the GUIDE PIPE ④, the special washer ③ (lower) and the Spring Coil ⑤, in that order.

2. Remounting

1) Mount the Spring Coil ⑤, the special washer ③ (lower), the GUIDE PIPE ④, the special washer ③ (upper) and the special nut ②, in that order, to the axle ⑥.

2) Mount the CAP ① onto the axle ⑥.

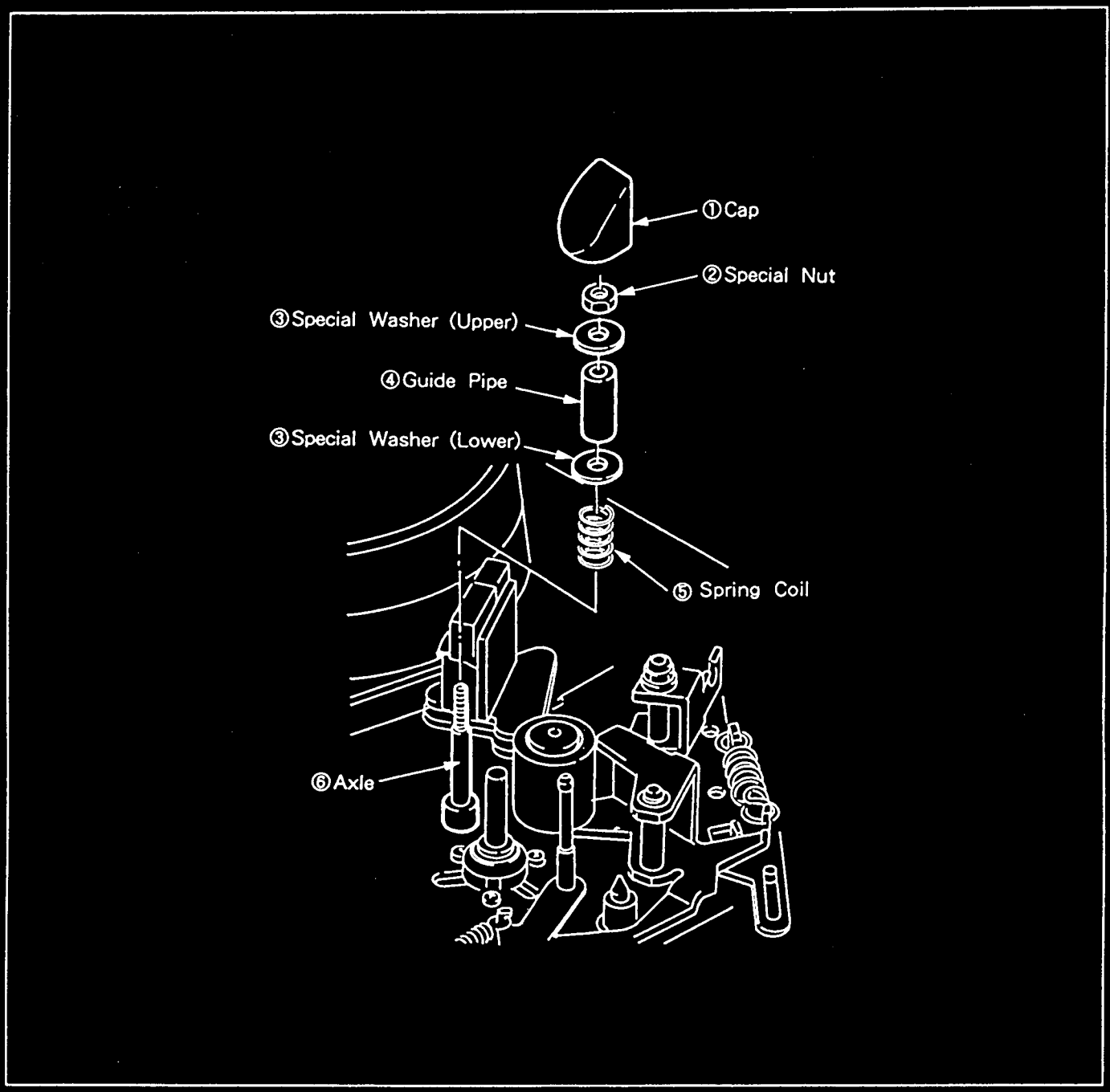


Fig. 7-7-29. Fixed Guide(T)

7-7-11. Drum Section

(1) DRUM MOTOR (ROTOR, STATOR)
(See Fig. 7-7-30.)

1. Removal
1) Remove the screw ①, then remove the CYLINDER EARTH ASS'Y ②.
2) Remove the two screws ③, then remove the ROTOR ④ and the SPACER.
3) Remove the STATOR board connector.
4) Remove the three screws ⑤, then remove the STATOR ⑥.

2. Remounting
1) Mount the STATOR ⑥ with the three screws ⑤.
2) Mount the SPACER ⑪ onto the AXLE ⑫.
3) While aligning the ROTOR oval hole ⑦ with the ROTOR DISK hole ⑧, mount the ROTOR with the two screws ③.
4) Insert the connector ⑩.
5) While aligning the CYLINDER EARTH ASS'Y ② protuberance with the chassis hole ⑨, mount it with the screw ①.

Note 1: Use a torque driver (VHJ-0014) for mounting the STATOR ⑥ and the ROTOR ④. Set fastening torque to 3 kg-cm.

Note 2: When the drum unit has been replaced, perform a tape path adjustment as instructed in 7-4. and perform a SW PHASE adjustment of the servo circuit.

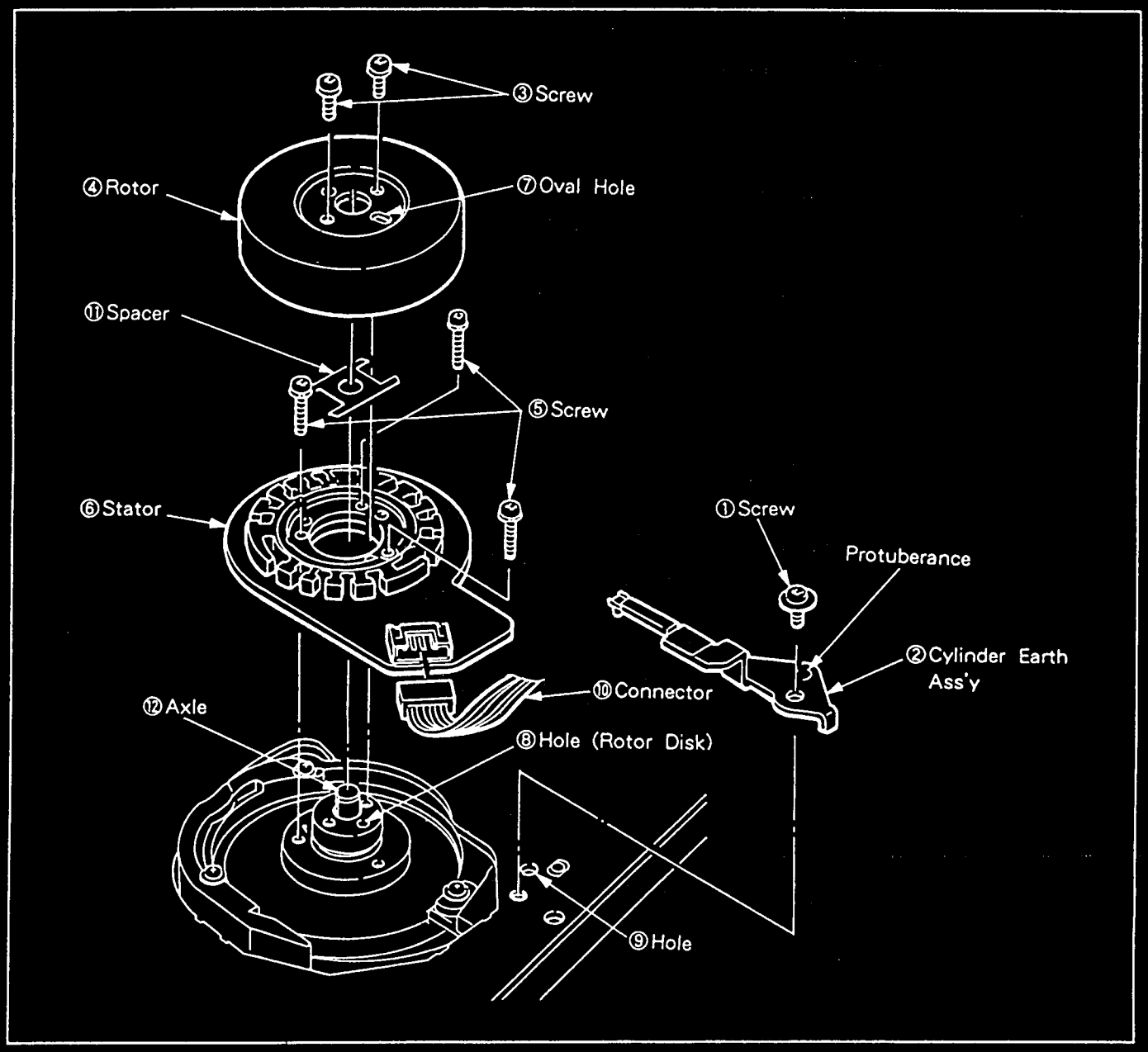


Fig. 7-7-30. Drum Motor

(2) DRUM UNIT (See Fig. 7-7-31.)

1. Removal

1) For some models with the board located above the upper drum, remove the board.
2) Remove the flexible cable ① from the PRE-AMP UNIT (take care not to pull the flexible cable in the upward direction).
3) Remove the LOAD RACK only, as instructed in P.110.
4) Remove the three screws ②, then remove the drum unit ③.

Note: When removing and remounting the drum unit, handle it carefully to protect it from scratches and dirt.

2. Remounting

1) While aligning the drum unit ③ to the protuberance, mount it to the drum base (CYLINDER BASE) ⑤ with the three screws ②.
2) Mount the ROAD RACK as instructed in P.110.
3) Insert the flexible cable into the PRE-AMP UNIT.
4) Clean the drum unit.
5) Perform the tape path adjustment as instructed in 7-4. and perform the SW PHASE adjustment of the servo circuit.

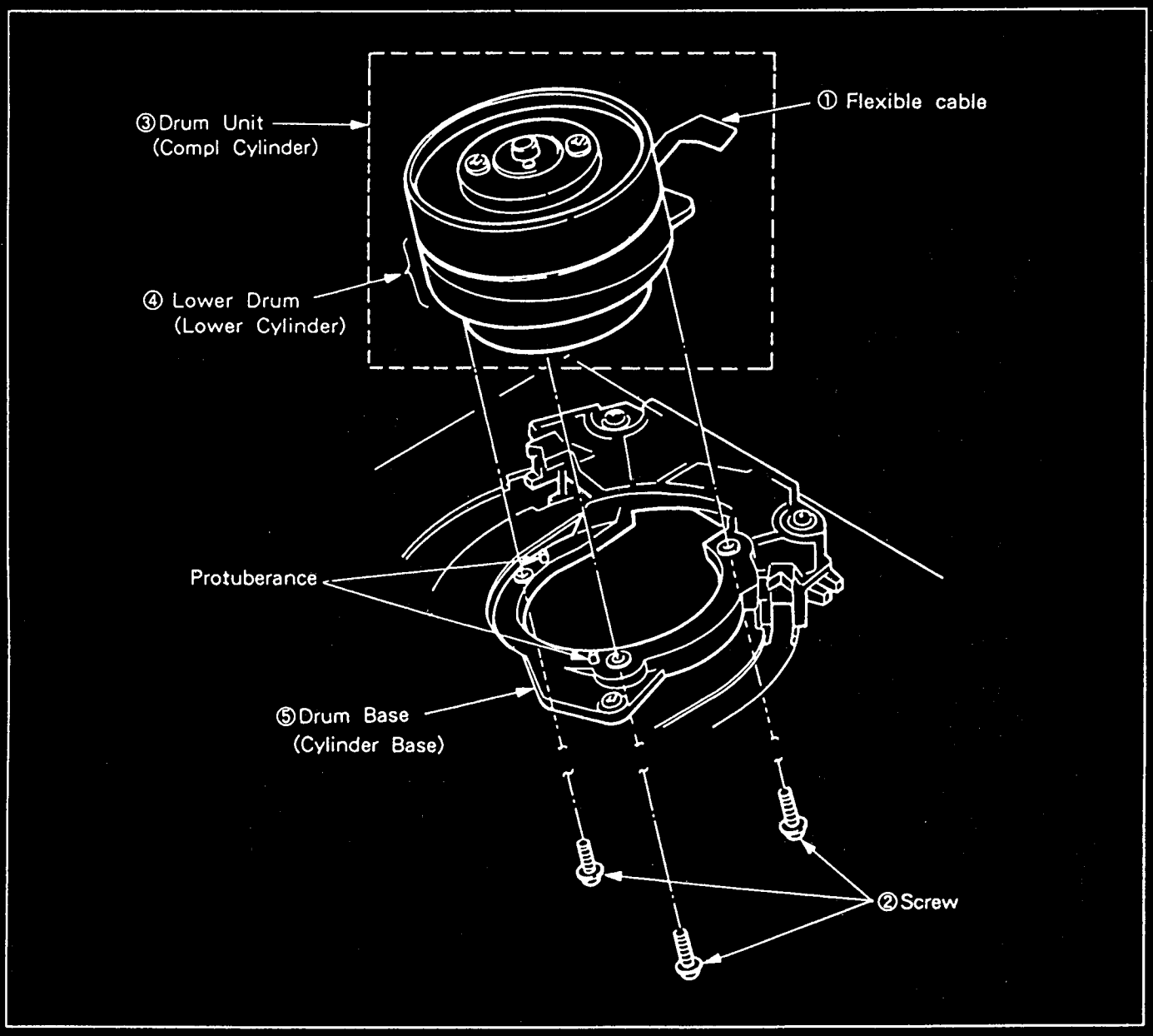


Fig. 7-7-31. Drum Unit(Compl Cylinder)

(3) UPPER DRUM (Upper Cylinder)

1. Removal

1) Remove the two screws ①. (See Fig. 7-7-32.)
2) In case the RE (ROTARY ERASE) HEAD is attached to the upper drum (UPPER CYLINDER), remove the lead wires soldered from the P.C. board. (See Fig. 7-7-33.)
3) Turn the head removing jig (VHJ-0041) handle ② counterclockwise to lift up the stopper ③. (See Fig. 7-7-34.)
4) Insert the two long screws ④ of the jig into the screw holes ⑥ located on the head chip side of the upper drum (UPPER CYLINDER) ⑤, then mount by turning the handle clockwise.
5) While holding the jig so that the upper drum ⑤ does not rotate, turn the handle ② clockwise to remove the upper drum.
6) Remove the jig from the upper drum.

Note: Handle parts carefully to protect the drum from scratches and dirt, and the video head from damage.

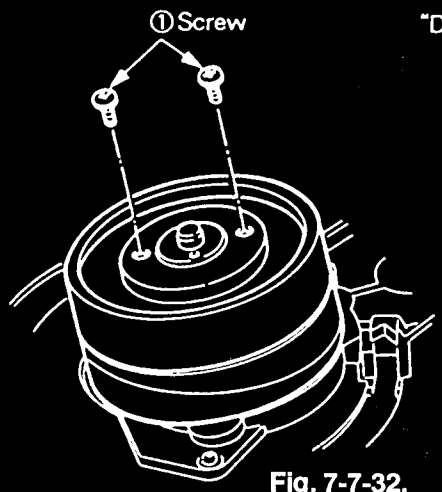


Fig. 7-7-32.

Lead wires of Rotary Erase Head (Model for flying erase capability)

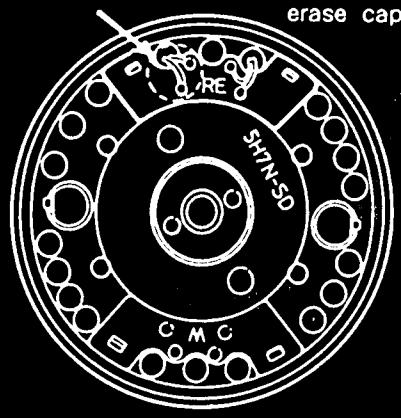


Fig. 7-7-33.

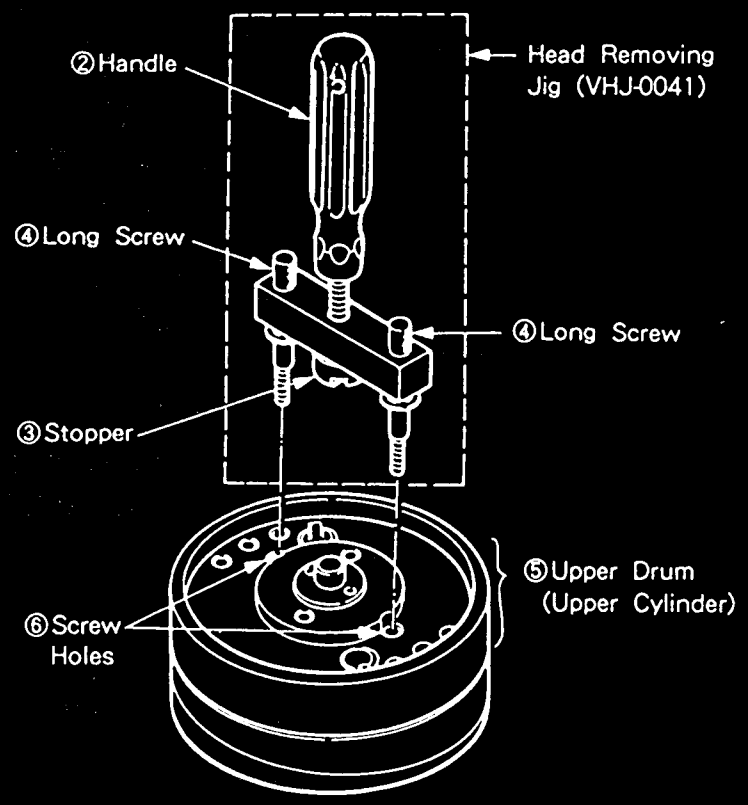


Fig. 7-7-34.

Upper Drum(Upper Cylinder)

2. Remounting (See Fig. 7-7-35.)

1) Confirm that surfaces where the flywheel and the upper drum (UPPER CYLINDER) are engaged or make contact are free from scratches and dirt.
2) The code name ① of the drum is printed on the video head side of the upper drum ⑤ SP CH-1 (channel A, plus azimuth). The code name ① is set with in the rotary transformer terminal round hole side ② position of lower drum (LOWER CYLINDER), so that the two screw holes ③ of the upper drum are aligned with the two screw holes ④ of the flywheel. (Refer to 3. Recognizing the SP CH-1 Head side.)
3) In case the RE (ROTARY ERASE) HEAD is attached to the upper drum, pass the lead wires through the lead wire hole. (See Fig. 7-7-33.)
4) While keeping the upper drum ⑤ parallel to the lower drum (LOWER CYLINDER) ⑧, insert it completely into the flywheel.
5) Temporarily tighten the two screws ⑦ alternately a little at a time, then tighten them to a torque of 6 kg-cm using a torque driver (VHJ-0014) and a 3 mm bit (VHJ-0045).
6) In case the RE head is attached to the upper drum ⑤, solder the lead wires to the P.C. board. Solder the red lead wire to the R terminal, and the yellow lead wire to the Y terminal.

Note: When the upper drum has been replaced, perform a tape path adjustment as instructed in 7-4. and the SW PHASE adjustment of the servo circuit.

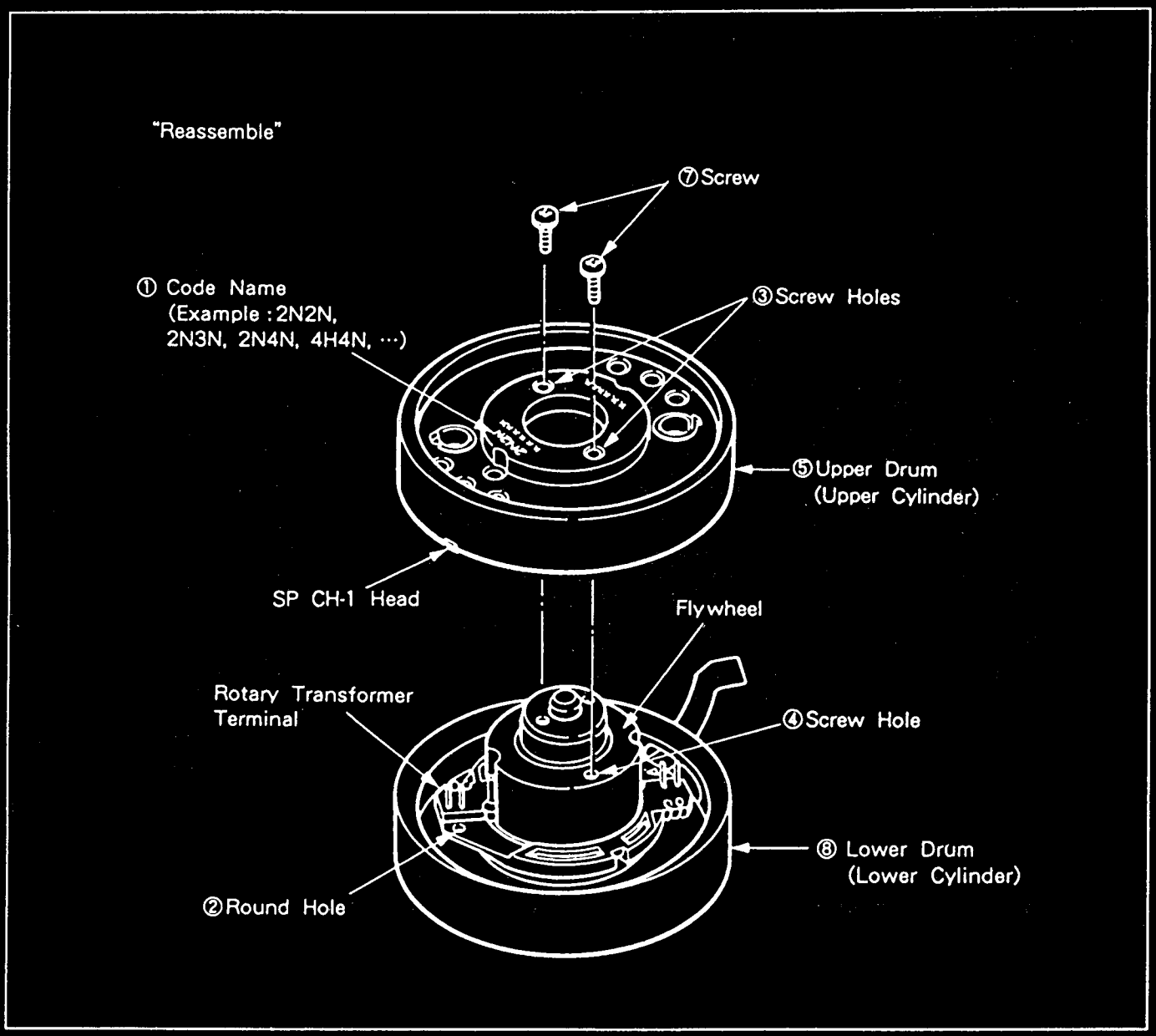


Fig. 7-7-35.

SECTION 8
ELECTRICAL ADJUSTMENTS

PREPARATION

EQUIPMENT

- Color TV monitor
- NTSC Color-bar generator (with RF and LINE OUTPUT)
- Audio signal generator
- Oscilloscope (dual trace, frequency response : 30MHz or more) (Use a 10 : 1 probe unless specified otherwise.)
- Vectorscope
- Frequency counter
- AC voltmeter
- In/Output probes

In making the adjustment, an alignment tape for VHS (NTSC). If a model is specified, be sure to use a tape of the model.

【Alignment Tape (MH-1)】(H-7099-046-H) (NTSC)

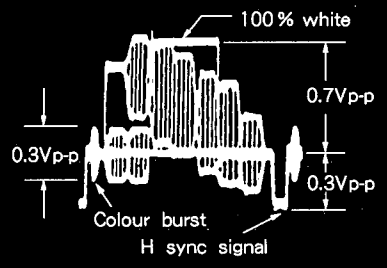
	Mode	Time	Video signal	Audio signal
1	SP	10minutes	Stair-step	6kHz
2	SP	5minutes	–	3kHz
3	SP	10minutes	Color bar	1kHz
4	SP	3minutes	RF sweep	–

【Alignment Tape (HiFi 400Hz)】(H-7099-153-H) (NTSC)

SET-UP

Because the RF input signal is used for circuit adjustments, connect the color-bar generator to the VIDEO IN terminal of the VCR. It is important that the video output signal satisfies the items shown in Fig. 2-1. Connect the oscilloscope to the VIDEO OUTPUT terminal of the TB-1 BOARD and terminate with a 75 Ω load, and then check the video output signal.

- The amplitude of the video signal should be approximately 0.3Vp-p.
- The amplitude of the video signal should be approximately 0.7Vp-p.
- While observing the oscilloscope or TV screen, make fine-tuning adjustments so that the color burst amplitude is approximately 0.3Vp-p.
- Check to be sure that there is no spike noise in the sync part of the horizontal sync signal.



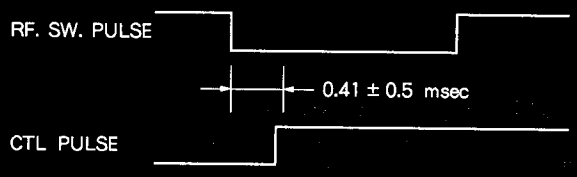
8-1. SERVO CIRCUIT ADJUSTMENTS

NORMAL TRACKING Adjustment

Mode	Playback 2H mode
Signal	Alignment tape NTSC HiFi 400Hz
Measurement point	TP351 or J3517 (CTL PULSE) TP182 (RF. SW. PULSE) PRE AMP unit
Measurement equipment	Oscilloscope
Adjustment element	VR353
Specified value	0.41 ± 0.5msec

Adjustment Method

1) Make sure that the normal tracking VR is at the center click.
2) Trigger upon the fall of RF. SW. PULSE (PRE AMP TP182), and adjust VR353 so that the rise of CTL PULSE may be retarded by 0.41 ± 0.5 msec. as compared with the fall of RF. SW. PULSE.



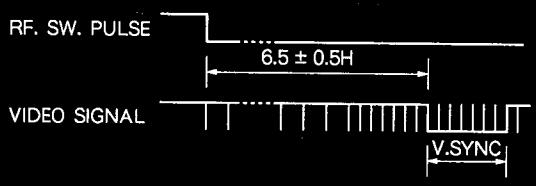
Note: 1) This adjustment should be performed before the adjustment of X-value of the mechanism.

SW PHASE (CH-1) Adjustment

Mode	Playback 2H mode
Signal	Alignment tape NTSC HiFi 400Hz
Measurement point	Video output terminal TP182 (RF. SW. PULSE) PRE AMP unit
Measurement equipment	Oscilloscope
Adjustment element	VR354
Specified value	6.5 ± 0.5H

Adjustment Method

1) Make sure that the normal tracking VR is at the center click.
2) Trigger upon the fall of RF. SW. PULSE (PRE AMP TP182), and adjust so that the front edge of the vertical sync signal is retarded by 6.5 ± 0.5H as compared with the fall of RF. SW. PULSE.



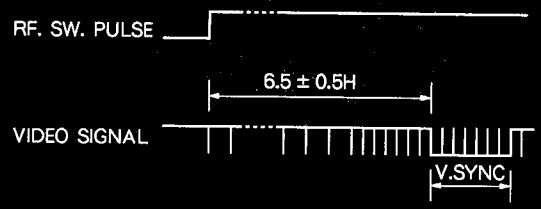
Note: 1) Check tapes should be NTSC HiFi 400Hz or the equal ones.

SWITCHING POSITION (CH-2) Check

Mode	Playback 2H mode
Signal	Alignment tape NTSC HiFi 400Hz
Measurement point	Video output terminal TP182 (RF. SW. PULSE) PRE AMP unit
Measurement equipment	Oscilloscope
Specified value	6.5 ± 0.5H

Adjustment Method

1) Make sure that the normal tracking VR is at the center click.
2) Trigger upon the fall of RF. SW. PULSE (PRE AMP TP182), and make sure that the front edge of the vertical sync signal is retarded by 6.5 ± 0.5H as compared with the fall of RF. SW. PULSE.



Note: 1) Make sure that the phase difference between CH-1 and CH-2 switching positions is within 0.5H.
2) Check tapes should be NTSC HiFi 400Hz or the equal ones.

STILL V-LOCK Adjustment

Mode	Self-recording, Playback 2H mode
Signal	monoscope pattern
Measurement point	Monitor screen
Measurement equipment	Monitor
Adjustment element	VR724 (TM-2 BOARD)

Adjustment Method

1) Adjust STILL ADJUST (VR724) so that center of the monitor screen may be stabilized at STILL.

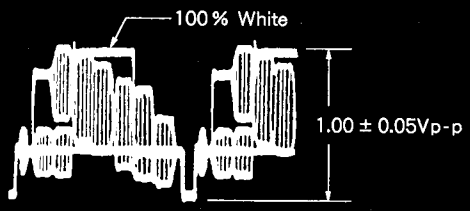
8-2. VIDEO CIRCUIT ADJUSTMENTS

AGC LEVEL Adjustment

Mode	E-E
Signal	NTSC Color bar
Measurement point	VIDEO OUT (TP101)
Measurement equipment	Oscilloscope
Adjustment element	VR102
Specified value	1.00 ± 0.05Vp-p

Adjustment Method

1) Adjust VR102 so that the level is 1.00 ± 0.05Vp-p.

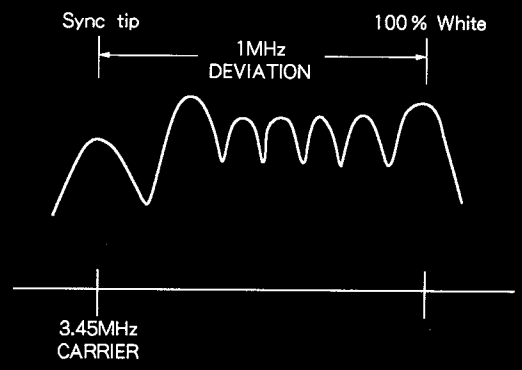


DEVIATION, CARRIER SET Adjustment

Mode	E-E
Signal	NTSC Color bar
Measurement point	TP103
Measurement equipment	Spectrum analyzer
Adjustment element	VR103 (carrier) VR104 (deviation)
Specified value	3.80 ± 0.05MHz (carrier frequency) 1.00 ± 0.05MHz (deviation)

Adjustment Method

1) Adjust the carrier frequency to 3.80 ± 0.05MHz and the deviation to 1.00 ± 0.05MHz in color bar input E-E state.



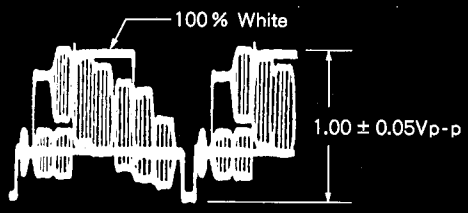
Note : The 100% white frequency must be within 4.80 ± 0.05MHz, in this case.

PB LEVEL Adjustment

Mode	Playback 2H mode
Signal	Alignment tape MH-1
Measurement point	VIDEO OUT (TP101)
Measurement equipment	Oscilloscope
Adjustment element	VR101
Specified value	1.00 ± 0.05V_{P-P}

Adjustment Method

1) Terminate VIDEO OUTPUT terminal with a 75 ohms.
2) Adjust VR101 so that the level is 1.00 ± 0.05Vp-p.

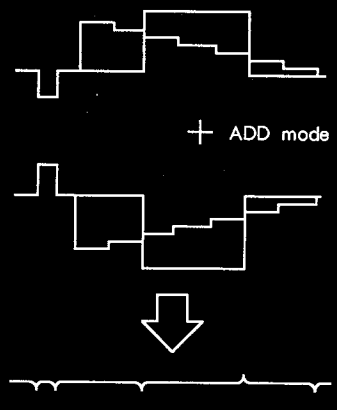


DOC LEVEL (N. C.) Adjustment

Mode	Playback 2H mode
Signal	ⓐ Alignment tape MH-1 (or self-recording playback) ⓑ Alignment tape NX-S704M
Measurement point	ⓐ IC101 ⑨pin, ⑩pin ⓑ VIDEO OUT (TP101)
Measurement equipment	Oscilloscope
Adjustment element	VR105

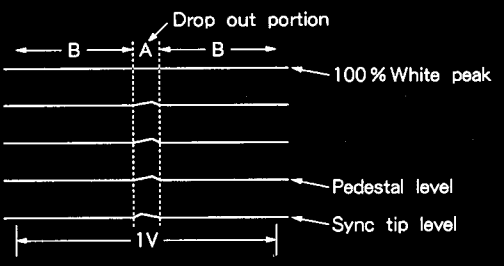
Adjustment Method ⓐ

1) Holding IC101⑨pin in CH1, IC101⑩pin in CH2, one of the channels is inverted in the same range, using in the add mode.
2) Adjust VR105 so that the waveform becomes minimum.



Adjustment Method ⓑ

1) Adjust VR105 so that the white peak level of the drop-out is nearly equal to that of the non-drop-out.



REC C CURRENT Adjustment

Mode	Recording 2H mode
Signal	NTSC Color bar
Measurement point	TP181 (Ground at the shield case) PRE AMP unit
Measurement equipment	Oscilloscope
Adjustment element	VR182 (VP-1 BOARD)
Specified value	75 ± 5mVp-p

Adjustment Method

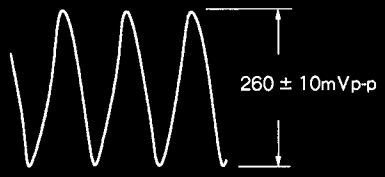
1) Connect TP102 and TP103 with jumper wire.
2) Adjust VR182 so that the level is 75 ± 5mVp-p.

REC Y CURRENT Adjustment

Mode	Recording 2H mode
Signal	No-signal
Measurement point	TP181 (Ground at the shield case) PRE AMP unit
Measurement equipment	Oscilloscope
Adjustment element	VR181 (VP-1 BOARD)
Specified value	260 ± 10mVp-p

Adjustment Method

1) Adjust VR181 so that the level is 260 ± 10mVp-p.

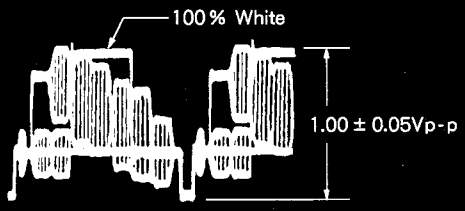


RECORD AND PLAYBACK LEVEL Checking

Mode	Self-recording, Playback 2H mode
Signal	NTSC color bar
Measurement point	VIDEO OUT (TP101)
Measurement equipment	Oscilloscope

Adjustment Method

1) Terminate the video output terminal at 75ohms, and input color bar signal including 100 % white to record and playback. Make sure that the output level is 1.00 ± 0.05Vp-p.



8-3. AUDIO CIRCUIT ADJUSTMENTS

BIAS LEVEL Adjustment

Mode	Recording 2H mode
Signal	No-signal
Measurement point	TP201 (HOT) TP202 (COLD)
Measurement equipment	AC voltmeter Frequency counter
Adjustment element	VR201
Specified value	22mV 71 ± 5kHz

Adjustment Method

1) Load a cassette tape, and set the voltage between TP202(COLD)and TP201(HOT) to 22mV(220 μ A).
2) Make sure that the oscillation frequency is 71kHz ± 5kHz.

NORMAL PB LEVEL Adjustment

Mode	Playback 2H mode
Signal	Alignment tape MH-1(1kHz section)
Measurement point	Audio output terminal
Measurement equipment	AC voltmeter
Adjustment element	VR202
Specified value	− 7 ± 1dBm

Adjustment Method

1) Play back the Alignment tape (MH-1), and adjust so the output voltage to − 7 ± 1dBm.

ALC OUTPUT Checking

Mode	Playback
Signal	1kHz
Measurement point	Audio output terminal
Measurement equipment	AC voltmeter

Adjustment Method

1) Make standard input into audio input jack and, in the E-E mode, wait until the output voltage of the audio output jack stabilizes.
2) Set the input level to − 20dB and to +20dB and confirm that the fllowing standards are fulfilled.

Input Level	Output Level
+ 20dB	−6 ± 2dBs
0dB	−7 ± 3dBs
−20dB	−28 ± 4dBs

RECORD CURRENT Checking

Mode	Recording
Signal	1kHz
Measurement point	TP201 (HOT) TP202 (COLD)
Measurement equipment	AC voltmeter
Specified value	2.7 ± 0.5mV

Adjustment Method

1) Input the reference input to be in record state.
2) Short-circuit between Q2001 base and emitter to stop the bias oscillation. (Or, pass the output signal between TP202 (COLD) and TP201(HOT) through 1kHz B. P. F. to remove the bias.)
3) Make sure that the record current is 2.7 ± 0.5mV.

FREQUENCY CHARACTERISTIC Check and Adjustment

Mode	Recording and Playback 2H mode
Signal	Reference input (− 20dB)
Measurement point	Audio output terminal
Measurement equipment	AC voltmeter
Specified value	− 1dB ~ +2dB

Adjustment Method

1) In 2H mode, play 1kHz and 10kHz signals. Confirm that the 10kHz play level is in − 1dB to +2dB range in relation to 1kHz play level.

Recording and Playback Output Check and Distortion Factor Check

Mode	Recording and Playback 2H mode
Signal	1kHz
Measurement point	Audio output terminal
Measurement equipment	AC voltmeter and Distortion Factor meter
Specified value	Playback level : − 7 ± 3dBm Distortion factor : 3% or less

Adjustment Method

1) Make standard input (1kHz) into audio input jack and, in the E-E mode, wait until the output of the audio output jack stabilizes.
2) Play recording in the 2H mode. Confirm that play output is − 7 ± 3dBs. Also, confirm that the distortion rate is 3% or less

OVERALL S/N Check

Mode	Recording and Playback 2H mode
Signal	1kHz, − 7dBm
Measurement point	Audio output terminal
Measurement equipment	AC voltmeter
Specified value	43dB of more (2Hmode)

Adjustment Method
Confirm that the difference between the standard input play level and the non-signal input play level is 43dB or more in 2H mode.

PLAYBACK OUTPUT (12H MODE) Adjustment

Mode	Playback 12H mode (AUDIO ON)
Signal	Alignment tape MH-1 (1kHz section)
Measurement point	Audio output terminal
Measurement equipment	AC voltmeter
Adjustment element	VR204
Specified value	− 7 ± 1dBm

Adjustment Method
1) Playback the Alignment tape (MH-1), and adjust so the output voltage to − 7 ± 1dBm.

PLAY BACK OUTPUT (24H MODE) Adjustment

Mode	Playback 24H mode
Signal	Alignment tape MH-1 (1kHz section)
Measurement point	Audio output terminal
Measurement equipment	AC voltmeter
Adjustment element	VR203

Adjustment Method
1) Playback the Alignment tape (MH-1), and adjust so the output voltage to − 7 ± 1dBm.

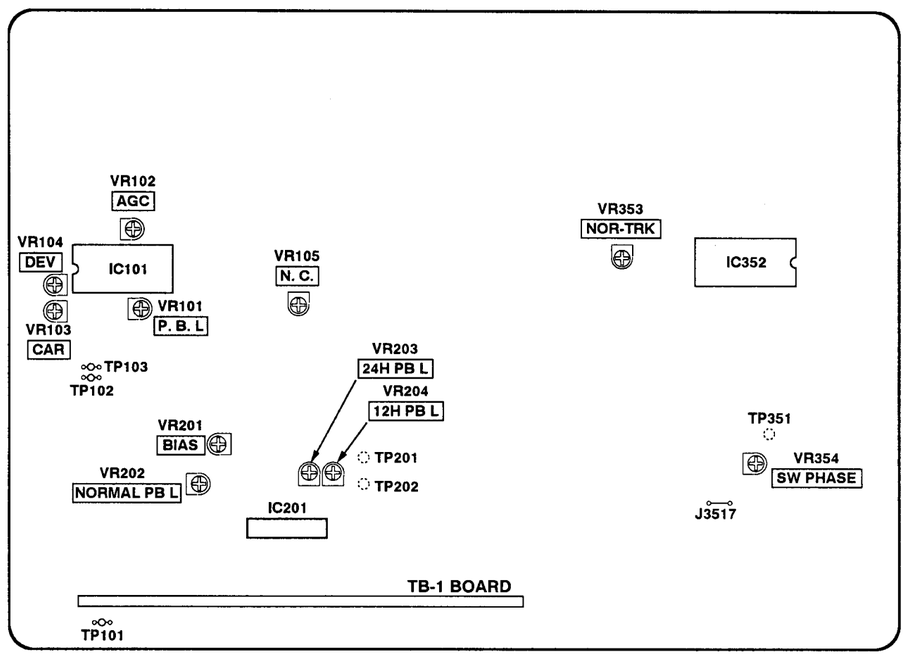
MIC AMP Check

Mode	E-E
Signal	1kHz, − 60dBm (MIC terminal)
Measurement point	Audio output terminal
Measurement equipment	AC voltmeter
Specified value	− 10 ± 3dBm

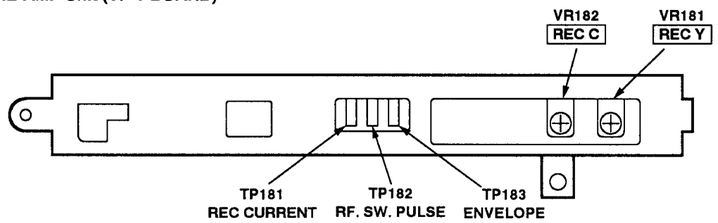
Adjustment Method
1) Input 1kHz, − 60dBs signal to MIC input jack.
2) In the E-E mode, confirm that the audio output level is − 10 ± 3dBs.

8-4. PARTS ARRANGEMENT DIAGRAMS FOR ADJUSTMENT

CP-1 BOARD (COMPONENT SIDE)



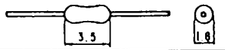
PRE-AMP Unit (VP-1 BOARD)



Description

CARBON RESISTOR 5% ⅛W
5% ¼W

A



Value	Part. No.	Value	Part. No.	Value	Part. No.	Value	Part. No.	Value	Part. No.	Value	Part. No.
0.22Ω		11Ω	1-247-784-00	200Ω	1-247-814-11	3.6kΩ	1-247-844-11	62kΩ	1-247-874-11	1.2MΩ	1-259-877-11
0.27Ω		12Ω	1-249-394-11	220Ω	1-249-409-11	3.9kΩ	1-249-424-11	68kΩ	1-249-439-11	1.5MΩ	1-259-878-11
0.33Ω		13Ω	1-247-786-11	240Ω	1-247-816-11	4.3kΩ	1-247-846-11	75kΩ	1-247-876-11	1.8MΩ	1-259-879-11
0.39Ω		15Ω	1-249-395-11	270Ω	1-249-410-11	4.7kΩ	1-249-425-11	82kΩ	1-249-440-11	2.0MΩ	
0.47Ω	1-249-377-11	16Ω	1-247-788-00	300Ω	1-247-818-11	5.1kΩ	1-247-848-11	91kΩ	1-247-878-00	2.2MΩ	1-259-880-11
0.56Ω	1-249-378-11	18Ω	1-249-396-11	330Ω	1-249-411-11	5.6kΩ	1-249-426-11	100kΩ	1-249-441-11	2.7MΩ	1-259-881-11
0.68Ω	1-249-379-11	20Ω	1-247-790-11	360Ω	1-247-820-11	6.2kΩ	1-247-850-11	110kΩ	1-247-880-11	3.3MΩ	1-259-882-11
0.82Ω	1-249-380-11	22Ω	1-249-397-11	390Ω	1-249-412-11	6.8kΩ	1-249-427-11	120kΩ	1-247-881-00	3.9MΩ	1-259-883-11
1.0Ω	1-249-381-11	24Ω	1-247-792-11	430Ω	1-247-822-11	7.5kΩ	1-247-852-11	130kΩ	1-247-882-11	4.7MΩ	1-259-884-11
1.2Ω	1-249-382-11	27Ω	1-249-398-11	470Ω	1-249-413-11	8.2kΩ	1-249-428-11	150kΩ	1-247-883-00	5.6MΩ	
1.5Ω	1-249-383-11	30Ω	1-247-794-11	510Ω	1-249-442-11	9.1kΩ	1-247-854-11	160Ω	1-247-884-11	6.8MΩ	
1.6Ω		33Ω	1-249-399-11	560Ω	1-249-414-11	10kΩ	1-249-429-11	180Ω	1-247-885-00	8.2MΩ	
1.8Ω	1-249-384-11	36Ω	1-247-796-11	620Ω	1-247-826-00	11kΩ	1-247-856-00	200kΩ	1-247-886-11	10MΩ	
2.2Ω	1-249-385-11	39Ω	1-249-400-11	680Ω	1-249-415-11	12kΩ	1-249-430-11	220kΩ	1-247-887-00	12MΩ	
2.4Ω	1-247-768-00	43Ω	1-247-798-11	750Ω	1-247-828-11	13kΩ	1-247-858-11	240kΩ	1-247-888-11	15MΩ	
2.7Ω	1-249-386-11	47Ω	1-249-401-11	820Ω	1-249-416-11	15kΩ	1-249-431-11	270kΩ	1-247-889-00	18MΩ	
3.0Ω	1-247-770-00	51Ω	1-247-800-11	910Ω	1-247-830-11	16kΩ	1-247-860-11	300kΩ	1-247-890-11	22MΩ	
3.3Ω	1-249-387-11	56Ω	1-249-402-11	1.0kΩ	1-249-417-11	18kΩ	1-249-432-11	330kΩ	1-247-891-00		
3.6Ω	1-247-772-00	62Ω	1-247-802-11	1.1kΩ	1-247-832-11	20kΩ	1-247-862-11	360kΩ	1-247-892-11		
3.9Ω	1-249-388-11	68Ω	1-249-403-11	1.2kΩ	1-249-418-11	22kΩ	1-249-433-11	390kΩ	1-247-893-11		
4.3Ω	1-247-774-00	75Ω	1-247-804-11	1.3kΩ	1-247-834-11	24kΩ	1-247-864-11	430kΩ	1-247-894-11		
4.7Ω	1-249-389-11	82Ω	1-245-404-00	1.5kΩ	1-249-419-11	27kΩ	1-249-434-11	470kΩ	1-247-895-00		
5.1Ω	1-247-776-00	91Ω	1-247-806-11	1.6kΩ	1-247-836-11	30kΩ	1-247-866-11	510kΩ	1-247-896-11		
5.6Ω	1-249-390-11	100Ω	1-249-405-11	1.8kΩ	1-249-420-11	33kΩ	1-249-435-11	560kΩ	1-247-897-11		
6.2Ω	1-247-778-00	110Ω	1-247-808-11	2.0kΩ	1-247-838-00	36kΩ	1-247-868-11	620kΩ	1-247-898-11		
6.8Ω	1-249-391-11	120Ω	1-249-406-11	2.2kΩ	1-249-421-11	39kΩ	1-249-436-11	680kΩ	1-247-899-11		
7.5Ω	1-247-780-00	130Ω	1-247-810-11	2.4kΩ	1-247-840-00	43kΩ	1-247-870-11	750kΩ	1-247-900-11		
8.2Ω	1-249-392-11	150Ω	1-249-407-11	2.7kΩ	1-249-422-11	47kΩ	1-249-437-11	820kΩ	1-247-901-11		
9.1Ω	1-247-782-00	160Ω	1-247-812-11	3.0kΩ	1-247-842-11	51kΩ	1-247-872-11	910kΩ	1-247-902-11		
10Ω	1-249-393-11	180Ω	1-249-408-11	3.3kΩ	1-249-423-11	56kΩ	1-249-438-11	1.0MΩ	1-247-903-00		

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